Studies and Practices for Advancement in Open and Distance Education

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Edited by Kam Cheong Li Kin Sun Yuen

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## Preface

This volume is a collection of 24 extended papers from the 28th Annual Conference of the Asian Association of Open Universities (AAOU), which was held in October 2014 at the Open University of Hong Kong (OUHK).

This event served as a key international platform in Asia for sharing the latest research and best practices in open and distance learning (ODL). The articles, which have been enhanced from selected presentations at the conference, represent contemporary efforts to advance ODL. Recognizing the value of sharing these papers through an edited book, the OUHK offered to compile and publish them for ODL professional development.

These articles have been grouped into three sub-themes. The first seven papers are concerned with 'institutional research in ODL'; the next nine deal with 'institutional advancement and innovations'; and the last eight focus on 'research and innovative ODL practices'.

To encourage the development of an open culture for sharing educational resources freely, the papers are published under a Creative Commons licence. This copyright licence (CC BY-NC-ND 3.0) allows you to copy and distribute the articles for non-commercial purposes, provided that you give credit to the authors concerned and the work is not altered or modified.

We would like to thank all the authors for contributing to this volume. We are much obliged to the OUHK Educational Technology and Publishing Unit for its design, editing and administrative support. We also extend our gratitude to the staff of the OUHK University Research Centre for their effective support in handling the papers.

We have enjoyed working with the authors of these studies and hope that you will find the articles in this book interesting and valuable.

Kam Cheong Li Kin Sun Yuen

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## Leading and managing change in education: Putting transformational leadership into practice

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Abstract: Today, educators are working in a rapidly changing environment. As change creates immense opportunities for improvement, leading and managing changes has become an essential responsibility for them. This paper analyses a scenario of an educational change in a university and illustrates how educators led and managed it. The scenario involves the launching of a Community Health Care Education programme which aims to train different levels of health care personnel to provide communitybased nursing care. The programme has three levels, namely a Higher Diploma in Nursing Studies for the training of Enrolled Nurses (in a face-toface mode); a Diploma in Health Studies (Community Health Care) for the training of community health workers (in a distance learning mode); and a Home Health Watch Programme for the training of community volunteers (in a distance learning mode). The programme is a large-scale initiative in nursing education and is presented by the Division of Nursing and Health Studies of The Open University of Hong Kong. Transformational leadership, characterized by its distributed nature and capacity development objective, is adopted to facilitate change. This type of leadership is highly desirable for staff development and yields long-lasting results. With reference to Lewin's three-stage model of change, the change process is divided into the unfreezing stage, changing stage, and refreezing stage. Through force field analysis, the driving and restraining forces that influence the outcomes of change are modified to achieve the desired goal. The change is driven by transformational leadership through its four components: idealized influence, inspirational motivation, intellectual stimulation,

and individualized consideration. Strategies such as the following are implemented: the sharing of leadership; practising collegiality; motivating and empowering the staff; providing training and support; addressing the sources of stress and anxiety; and providing recognition. The change is considered to be effective. The present experience has valuable implications for educators in initiating educational change and positively affecting their educational practice.

**Keywords:** education change, transformational leadership, Lewin's threestage model of change, force field analysis, distance learning

## 1 Introduction

Contemporary educators are working in a rapidly changing environment (Hogan, 2012; Stewart, Khan & Hedberg, 2013) — which brings benefits to students, as well as educators and educational institutions. As a result of the changing educational landscape, the leadership and management responsibilities of educators continually increase. This paper analyses an actual educational change scenario in a university and illustrates how the educators lead and manage it.

With an ageing population and the prevalence of non-communicable diseases in Hong Kong, the provision of community-based nursing care is greatly required. There is a need for a structured programme which provides comprehensive education to prepare different levels of health care personnel (i.e. Enrolled Nurses, community health workers, and community volunteers) to perform various kinds of health care work in the community. However, no structured education programme exists for this purpose. In 2011, the Head of the Division of Nursing and Health Studies of The Open University of Hong Kong proposed the launching of a community health care education programme that included three levels. The proposal was enthusiastically accepted and funding was provided to the University. The new programme was launched in 2012.

An Associate Professor was assigned to be the programme coordinator and the change agent. The change involved the launching of three levels of an education programme, namely a Higher Diploma in Nursing Studies for the training of Enrolled Nurses (in a face-to-face mode), a Diploma in Health Studies (Community Health Care) for the training of community health workers (in a distance learning mode), and a Home Health Watch Programme for the training of community volunteers (in a distance learning mode). The programme aimed to train 650 Enrolled Nurses, 1,000 community health workers, and 1,500 community volunteers over five years. The related work included: programme development; course development; professional accreditation; the establishment of training facilities; the recruitment of teaching staff; the enrolment of students; the arrangement of practicums; quality assurance; and promotion and marketing. The new programme was a large-scale initiative in nursing education and was a great challenge to the Division.

The Division of Nursing and Health Studies is a well-structured academic unit of the University. It adopts a flattened pyramid structure where the Head and the Associate Head are situated at the top, followed by a number of programme teams and committees at the same level. Each programme team and committee has a leader. The Division head presides over the leaders and oversees major issues in the Division, while leaders direct their own groups and manage assigned tasks. The Division accommodates initiatives and suggestions, and has made various changes in the past years for growth and improvement. The flattened pyramid structure, which is less hierarchical than the traditional bureaucratic structure, contributes to the possibility of making changes. This structure also supports the implementation of transformational leadership which aims to build capacity and encourage the development of the staff. At the time when the change was made, the Division consisted of 29 academic staff, one technical staff, and three clerical staff.

This paper illustrates the adoption of transformational leadership in the Division to drive the change. Based on Lewin's three-stage model of change, the significant factors which influence the outcomes of change were modified to achieve the desired goal.

## 2 Leading and managing change

A leader identifies organizational goals, values and intentions by influencing individuals, whereas a manager ensures that these aspects are applied in practice. The predominant leadership style determines the management of change, as well as the achievement of improvement and effectiveness (Hallinger & Heck, 2003). In fact, sound strategic leadership has been identified as an essential factor in facilitating staff navigation of change in higher education (Drew, 2010).

Transformational leadership, with an emphasis on capacity-building among followers, was selected to achieve effective change. Transformational leadership was first explicated as a theory in the general literature of the 1970s and 1980s. Its application in education started in the 1990s as an opposing reaction to the top-down policy-driven changes that prevailed in the 1980s. The application of transformational leadership in schools has increased since then, and considerable research in education has employed the transformational leadership model (Hallinger, 2003).

Transformational leadership is a theory of leadership that is grounded in understanding individual needs instead of coordinating and controlling individuals to realize desired goals (Hallinger, 2003). A bottom-up approach is used to influence people, enhance motivation, and increase performance (Hallinger, 2003; Leithwood & Jantzi, 2000). Transformational leadership has four components: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration ('the four *Is*'). These four components direct the behaviours of a transformational leader and suggest ways in which a leader transforms the followers to achieve common goals (Bass, 1998; Bass & Avolio, 1994).

*Idealized influence* is the degree to which a leader acts as a role model for the followers. The leader demonstrates high standards of ethical and moral conduct which the followers learn and practise on others. It is through this mechanism that the leader gains more respect from the followers and achieves a higher level of influence.

*Inspirational motivation* is the degree to which the leader communicates a vision for the future which is appealing to the followers. The leader inspires the followers by providing meaning and value for the work at hand (McFarlane, 2011; Runhaar, Sanders & Yang, 2010). Such a practice makes the followers optimistic about the future and drives them to devote more effort.

*Intellectual stimulation* is the degree to which the leader encourages innovation and creativity. New ideas from the followers are welcomed rather than criticized; and the leader supports questioning the current state and discarding ineffective conventional practices.

*Individualized consideration* is the degree to which the leader respects the followers and addresses their needs through coaching and mentoring. The leader listens actively, provides learning opportunities, delegates tasks, arranges challenges, maintains open communication, recognizes individual difference, and celebrates individual contributions (Bass, 1998; Bass & Avolio, 1994).

Although transformational leadership is time-consuming to implement and requires considerable effort, this leadership style is highly desirable for staff development and yields long-lasting results (Leithwood, Jantzi & Steinbach, 1999). In any change scenario, staff development is an important concern because well-developed staff are essential for achieving a sustainable change. Transformational leadership was considered appropriate for the situation, considering the rapid growth of the Division and the numerous members of the academic staff who lacked experience in programme development.

## 3 Implementing a planned change

The use of planned change signified the intentional attempt to increase the chances of achieving success (Baulcomb, 2003). Kurt Lewin (1890–1947) was a seminal theorist of change whose work significantly affected the field of change theory (McGarry, Cashin & Fowler, 2012). Lewin's three-stage model of change indicates a planned change as a three-stage linear process, which consists of unfreezing, changing, and refreezing. The *unfreezing stage* involves overcoming inertia and breaking down existing mindsets, as well as motivating individuals and preparing them for change. The *changing stage* entails supporting individuals to make changes and raising their awareness of the positive aspects of change. The *refreezing stage* involves reinforcing new behaviours, crystallizing the mindset, and stabilizing the change (Lewin, 1951). In short, the unfreezing stage renders the change possible and the refreezing stage makes the change permanent.

Although developed over 60 years ago, Lewin's model remains widely used in different disciplines as a guide for change (McBrien, 2009; McGarry *et al.*, 2012; Schriner *et al.*, 2010). Lewin's model is straightforward to use, systematic in nature and allows an easy identification of progress across the stages (Schriner *et al.*, 2010). The model is effective in informing decision-making and fosters the feasibility and acceptability of change (McBrien, 2009). The above characteristics make Lewin's model a desirable choice for change guidance. It has been argued that Lewin's model requires a relatively slow rate of change, as well as consensual and learning foundations which make the model unsuitable for the demands of today's rapid changes (Collins, 1998; Watson, 1997; Wilson, 1992). However, building foundations is necessary for achieving a sustainable change and is a desirable value in this scenario. With reference to the above analysis, the foundation of this change was based on the work of Lewin (1951).

#### 3.1 The unfreezing stage

Change is achieved by moving from an actual to an optimal situation to accomplish a goal or solve a problem. Lewin emphasizes the necessity of identifying the totality of influences that developed the situation to understand it (Lewin, 1947). A force field analysis is a powerful tool for managing change during the unfreezing stage. This approach stresses that the equilibrium of every situation is maintained by two opposing forces: the forces that drive movement towards a change (driving forces) and those that block the movements towards a change (restraining forces). The environment is known as a 'field', where the force field is in equilibrium prior to any change. For change to occur, the equilibrium must be upset either by strengthening the driving forces or by weakening the restraining ones. A key determinant in achieving successful change is ensuring that the driving forces outweigh the restraining forces (Lewin, 1947, 1951). Therefore, the main tasks during the unfreezing stage are identifying the major forces of change, as well as developing strategies to strengthen the driving forces and weaken the restraining forces.

**Identifying the driving forces:** Having the experience of running nursing education for more than 15 years was an advantage for the Division. Past experience on nurse training can be adapted to develop a comprehensive

programme to train nurses, community health workers, and volunteers. The network with various health care institutions can be used to facilitate the arrangement of practicums for the new programme.

Staff members represent a valuable resource within any organization. The Division had the advantage of having recently expanded: over the two years before the change took place, the number of academic staff increased from 16 to 29, an adequate number to support the change. The main concern was involving and developing the staff to make the change, as the cooperation and involvement of the entire staff is essential to achieve lasting and effective educational change (Baulcomb, 2003; Willems & Willems, 2014). In this scenario, the availability of staff was the most important driving force and had to be significantly strengthened.

**Identifying the restraining forces:** Every change in education involves the institution and individuals. Individuals who face change may develop negative feelings (Morrison, 1998), which can lead to adverse effects when not properly addressed. The stress that originated from the University and the donor was a major negative feeling among the staff members. The change involved a significant project sponsored by a donor that had to be launched within a short time (one year). The high position of the University and the donor formed a structural power (Hoyle, 1986) that induced stress in the staff and affected their performance during the change.

The anxiety in response to an actual threat arising from the perception of an unknown situation was another negative feeling among the staff. In fact, anxiety is a common negative feeling towards change (Morrison, 1998). Several new staff lacked knowledge of programme development, course development, the delivery of distance learning courses, and other administrative procedures. Anxiety was induced when the staff anticipated that they had to engage in unknown situations.

Some staff resisted as well, which was understandable because the need for change remained unclear. When the change was initiated, the Division was performing well with a satisfactory student intake; and the change was perceived as having a disruptive effect on the normal routine. Although individuals react differently towards change, some will always resist it (Baulcomb, 2003; Morrison, 1998). Therefore, finding ways to seek support from individuals was necessary to reduce resistance and improve work efficiency.

Strengthening the driving forces: To practise individualized consideration and support staff development, a number of strategies were implemented. Transformational leadership emphasizes that leadership is shared (Hallinger, 2003; Leithwood & Jantzi, 2000). Rather than one individual coordinating and controlling all activities, transformational leadership focuses on creating a favourable environment and stimulating change through bottom-up participation (Day, Harris & Hadfield, 2001). As the change was associated with multiple tasks, a number of work groups were formed and the entire staff of the Division was involved. A leader was appointed for each work group based on experience, expertise, and preference. Strategies were performed to utilize the experienced staff, which simultaneously provided growth opportunities for the new staff. In the groups led by experienced staff, leaders could share their experience with their members who lacked experience in programme development. In the groups led by new staff who had committed to lead a group, leaders were supported by the experienced staff as group members. Group size was carefully determined, such that groups were sufficiently large to handle the assigned tasks and yet small enough to maintain internal communication and cohesiveness.

Intellectual stimulation was also adopted and the leaders of the work groups were supported in practising in an innovative and creative way, as long as the decisions were made through discussion and consensus. Dominance and coercion were avoided.

Weakening the restraining forces: Strategies were carried out to reduce the stress among the staff due to the tight timeline. In accordance with the project proposal, the programme coordinator described the three programme levels in detail and specified the launch date for each level. The three levels were re-scheduled to be launched one after another to make the timeline realistic. Effort was exerted to gain endorsement from the University and approval from the donor. The approved proposal was communicated to the entire staff and change actions were prioritized. By doing so, the major restraining force had been eradicated. Strategies were implemented to overcome anxiety among the staff. Through inspirational motivation, a transformational leader creates the future and encourages individuals to envision that future by extending their aspirations (Hallinger, 2003). The programme coordinator explained the new programme, as well as its future development and the potential benefits to the staff, and highlighted their contribution to the new programme.

Individualized consideration serves to address the needs of individual staff and respect their opinions. Training, which aims to equip staff with the necessary skills for performing new responsibilities, is regarded as an effective means for reducing the anxiety associated with new responsibilities and smoothening the initial chaotic stage of the change process (Talbot, 1993). Therefore, a series of training workshops on topics such as the development of distance learning course materials and coordination of distance learning courses were conducted, and the training content was reinforced during subsequent meetings. Scholars have argued that learning something new, which aims to overcome the threat of anxiety towards an imperative change, also induces anxiety. Schein (1996) calls the former 'survival anxiety' and the latter 'learning anxiety'. Learning anxiety arises from the exposure of an individual's incompetence resulting in his/ her assertion that the change is not important. Since learning anxiety will eventually transform into resistance to change, effort has to be made to reduce learning anxiety. Previous successful examples were presented to the staff members and they were reassured that assistance would be available whenever necessary. In addition, a strategy was performed to respect the opinions of staff members. Their feedback was collected and used to modify the plan for change. It was noticed that the staff were more willing to participate in the change when their voices were heard.

Although resistance is a common and natural coping mechanism against the rising instability from change, strategies can be adopted to facilitate the acceptance of the change by the individual (Schoolfield & Orduña, 2001). A way to seek support from individuals, particularly those who resist change, is to make them know their involvement and visualize their ownership. When the change process is participative and collaborative, it can result in an effective outcome (Burnes, 2004; Lewin, 1947). Thus, a bottom-up approach that involved most of the staff and sought to influence people was adopted. Although the change was introduced from the top, the fact that the execution was carried out from the bottom was clarified.

### 3.2 The changing stage

The main tasks of this stage were to impress on individuals the positive aspects of the change and support individuals to participate in it (Baulcomb, 2003; Lewin, 1951).

Inspirational motivation was adopted to articulate a clear vision and value for the change. The goals of individual work groups were linked to the goals of the Division to motivate the work groups and enhance their commitment to the assigned tasks (Hallinger, 2003). A few work groups were arranged to commence before the others. The success of these groups could build up the momentum of change. Regular meetings among work groups were held, which enabled them to visualize their interdependence and functioning in a holistic way to achieve the goal. Individual staff were fully informed about the progress of the change and attainment of certain milestones. Such a strategy can facilitate the development of a sense of achievement towards the change among the staff. Staff who demonstrated satisfactory performance in the initial stage were assigned a higher level of responsibility, which served as a strong indicator of their successful mastery of skills at the previous level. As a result, they were further motivated to continue their satisfactory efforts.

Intellectual stimulation was adopted to support initiatives. The leaders of various work groups were empowered with the autonomy to propose initiatives; delegate the tasks within their own work groups; organize their activities; plan their schedule within the programme timeline; and solve their own problems. The programme coordinator, who acted as a transformational leader, adopted a supportive role in assisting their development. Instead of providing strict instructions for the staff to follow, the programme coordinator gave information about the project, conducted training on relevant skills, gave advice whenever necessary, and intervened only when things went wrong or were behind schedule. A supportive environment is necessary to enhance motivation and commitment to change (Fitzgerald, 2002; Hulpia, Devos, & Keer, 2011), and a feeling of empowerment enabled the staff to achieve effective outcomes.

Idealized influence was implemented to achieve a high level of influence. The programme coordinator joined some of the work groups, participated with confidence and competence, demonstrated strong commitment to achieving the goal, behaved consistently with the vision, and acted as a role model for others. It was hoped that the staff would take pride in being associated as a group and would be motivated to achieve a higher level of performance.

#### 3.3 The refreezing stage

The main task at this stage was to re-establish the equilibrium and to stabilize the change (Lewin, 1947, 1951). Process and outcome evaluation were performed to ascertain the degree of achievement of the change and to find out to what extent students' expectations were met (Dursun, Oskaybas & Gokmen, 2013). It was noted that the programme was delivered on schedule. Students' academic performance and skill competence level were satisfactory. Numerous staff acquired skills in programme development and were confident about engaging in similar activities in the future. Most of the stakeholders were satisfied with their involvement and the outcomes of the change. The evaluation provided evidence to support the success of the change and also resulted in suggestions for further improvement. Working protocols and guidelines were developed to specify the essential activities in programme development, the roles and responsibilities of the staff in different positions, and the workflow of various activities. Lastly, recognition was provided to the staff who were involved in the change; and the idea of individualized consideration was applied. With all these efforts, a new shared culture was established.

## 4 Conclusion

Although change does not necessarily lead to improvement, improvement arises from change. Leading and managing change is a part of every educator's role, from minor changes that improve day-to-day operation to major ones that bring long-lasting effects to the education institution. This paper has analysed a scenario in which transformational leadership was adopted to achieve educational change in a university. The four components of transformational leadership —idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration — were applied. To be specific, a collegial approach was used, and leadership was shared among the staff. The transformational leader established a favourable environment, created a vision, supported and motivated the staff, spent considerable time on staff development, empowered the staff, and gave recognition to them.

Lewin's model provided useful guidance on unfreezing the existing equilibrium, moving towards the desired change, and freezing the change to form a new equilibrium. Force field analysis is a powerful tool for managing change and is effective in differentiating the forces that drive or restrain change. The present scenario, through force field analysis, demonstrated that change can be achieved by incorporating the driving and restraining forces within the planning and implementation of the change. Strengthening the driving forces and weakening or removing the restraining forces is an essential approach. Considerable effort must be devoted to handling the most significant driving and restraining forces.

Overall, the change was considered effective. The present experience demonstrated that change, even though large in scale, can be achieved through careful planning and consideration. Involving staff at all levels and in every step encourages staff development and allows them to gain ownership of the change, which can lead to positive outcomes.

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# Motivations and deterrents to MOOC offerings

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Abstract: This paper presents a study of the factors educational institutions take into account in deciding whether or not to offer MOOCs. It surveys the official publications and webpages of the institutions, as well as the relevant literature, to identify their motivations and deterrents on this issue. The findings show that the motivations revolve around several major aspects: self-marketing; financial, educational and research factors; and the advantages of strengthening relationships with potential partners and stakeholders. Of the deterrents, the uncertainty of learning effectiveness is the major one stated by the institutions, together with the concerns raised in the literature, including the technological requirements, cost, time and resources, the completion rate and plagiarism. The motivations echo to a large extent the findings of other similar surveys. In particular, self-marketing is the main driving force for offering MOOCs. Given only a few years of MOOC development, there are very limited empirical data on the extent to which the goals behind the motivations have been achieved. The findings of this study suggest further investigation on whether the provision of MOOCs has led to the desired outcomes of the institutions.

Keywords: massive open online courses, institutional motivation, course offering, open learning

## 1 Introduction

The rise of massive open online courses (MOOCs), in the few years since their emergence in 2008, has received very significant attention and a rapidly increasing number of institutions have been taking part in offering such courses. For example, the number of MOOC-offering institutions in the United States nearly doubled at the end of 2013 compared with 2012, i.e. from 2.6% to 5% (Allen & Seaman, 2014). Their courses are offered on different kinds of MOOC platforms, covering both for-profit and nonprofit ones, such as Coursera and edX, respectively. Yet, there are also many institutions which decide not to offer MOOCs. The different institutional decisions on MOOC provision reveal their diverse motivations and deterrents.

As MOOC is a relatively new mode of course delivery, there remain a lot of uncertainties for institutions about becoming involved in it. To determine whether and how to take part in providing courses, it is important for institutions to consider, for example, how the provision of MOOCs might help them to pursue their target market, serve their students better, leverage their advantages, and strengthen their relationships with potential students and other stakeholders.

This paper reports a study of the motivations for and deterrents to offering MOOCs. It surveys the official publications and webpages of the institutions for their justifications for offering MOOCs or not, and the relevant literature for other advantages and deterrents on this issue. The findings reveal the factors an institution needs to take into account regarding MOOC offerings.

## 2 Methodology

The data sources for this study include the official publications (e.g. press releases and bulletins) and webpages of the institutions which offer or do not offer MOOCs, and other relevant literature (e.g. research articles, reports and case studies). This survey excludes informal sources such as personal blogs and online forums, and materials released after 30 June 2014.

The MOOC-offering institutions were collected from the lists of partnering institutions of two major MOOC platforms (Coursera and edX), together with the relevant literature, especially case studies. Institutions which offer courses on available platforms and/or are involved in developing platforms are both included. On the other hand, the institutions which do not offer MOOCs were selected only from the literature.

The data collected were categorized into two groups: (1) institutional justifications for offering MOOCs or not from the case studies or official announcements of the institutions; and (2) personal viewpoints on the benefits or drawbacks of providing courses from other literature.

## 3 Motivations for offering MOOCs

The motivations are divided into groups of institutional justifications (Section 3.1), other advantages (Section 3.2) and threats of not offering MOOCs (Section 3.3).

## 3.1 Institutional justifications

Table 1 summarizes the institutional justifications for offering MOOCs with examples of the institutions provided. The justifications are categorized into the self-marketing, financial, educational and research factors.

#### Self-marketing factor

The provision of MOOCs can be viewed as a self-marketing strategy for an institution to enhance its brand image. The MOOC-offering institutions usually express, through their press releases, their intention of staying at the forefront in the global development of online education. For instance, Duke University claims that it aims to maintain its position as a leader in the exploration of online education (Duke Online Education Initiatives, n.d.). Peking University also presents its goal as 'leading the way in the new frontier of free online education' (Zhai, 2013). Also, the Hong Kong University of Science and Technology provides courses on edX as a demonstration of its 'commitment to contributing to the global development of online learning as an international research university' (HKUST, 2013).

An institution may utilize MOOCs as a means to showcase its academic excellence, by having renowned scholars to teach the courses. For example, the University of Hong Kong states that '[it] will call on professors with a track record of excellence in teaching to offer HKUx courses' (HKU, 2013). The International Telematic University (UNINETTUNO) also says that learners can have access to 'the best Italian and international lecturers drawn from a selection of the best courses of UNINETTUNO' (UNINETTUNO, n.d.).

Justification	Example
Self-marketing factor	
To expand the development of online learning on a global scale and be a pioneer in the field	<ul> <li>Duke University (Duke Online Education Initiatives, n.d.)</li> <li>Peking University (Zhai, 2013)</li> <li>The Hong Kong University of Science and Technology (HKUST, 2013)</li> </ul>
To demonstrate the strengths of the institution	<ul> <li>The University of New South Wales (UNSW, 2013)</li> <li>The University of Hong Kong (HKU, 2013)</li> <li>The International Telematic University (UNINETTUNO, n.d.)</li> </ul>
To establish the charitable status of the institution	<ul> <li>The Chinese University of Hong Kong (CUHK, 2013)</li> <li>University of Exeter (University of Exeter, n.d.)</li> </ul>
To reach the desirable market	
Recruit potential students	• University of Colorado-Boulder (Hollands & Tirthali, 2014)
<ul> <li>Reach out to new students and continuous engagement with alumni</li> <li>Draw public attention</li> </ul>	<ul> <li>Duke University (Duke Online Education Initiatives, n.d.)</li> <li>American Museum of Natural</li> </ul>
	History (Hollands & Tirthali, 2014)

Table 1	Institutional	justifications	for offering	MOOCs
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Financial factor	
To explore potential streams of revenue	<ul> <li>Georgia Institute of Technology (Georgia Institute of Technology, 2013)</li> </ul>
Educational factor	
To provide a better learning experience to their students	• San Jose State University (Oremus, 2013)
To close the gap between pre- university and university education	• Universitat Pompeu Fabra (Daza, Makriyannis & Riera, 2013)
Research factor	
To explore new pedagogical models and improve on-campus education	<ul> <li>University of Exeter (University of Exeter, n.d.)</li> <li>University of New South Wales (UNSW, 2013)</li> </ul>
To apply learning analytics	• Harvard University and Massachusetts Institute of Technology (Li & Powell, 2013)

Some institutions express their eagerness to educate anyone reachable in the broader society which may in return build up their brand (Bell, 2013). For example, the Chinese University of Hong Kong indicates its intention to take its courses worldwide and make them available to anyone free of charge (CUHK, 2013). The University of Exeter makes a more explicit claim that its provision of MOOCs 'may enhance the reputation of the institution and provide a public service aligned with [higher education's] non-profit charitable status' (University of Exeter, n.d.).

Institutions offering MOOCs may reach their target markets in different parts of the world by relaxing the constraints of time and location for taking the courses (Newsman & Oh, 2014). First, they identify and recruit potential candidates for their programmes. For instance, the University of Colorado-Boulder offers MOOCs in engineering with a plan to recruit students for its programme by sending the top performers information about the programme (Hollands & Tirthali, 2014). Second, MOOCs enable institutions to connect with prospective students and audiences they would like to continuously engage with (e.g. alumni) (King & Nanfito, 2012). Duke University claims that it would like to 'use online education to reach graduate, professional and alumni audience' (Duke Online Education Initiatives, n.d.). Third, providing MOOCs also helps institutions to draw public attention. The American Museum of Natural History in New York, through offering three courses in science, has the goals of reaching a wider population and raising its international visibility (Hollands & Tirthali, 2014).

#### **Financial factor**

MOOC provision may open up new revenue streams for institutions and hence is regarded as a strategic investment (Li & Powell, 2013). Institutions may generate revenue by issuing certificates, providing college credits, charging tuition fees, drawing MOOC participants to fee-based courses and degree programmes, licensing MOOC materials and providing premium online services (Hollands & Tirthali, 2014). For example, Georgia Institute of Technology has collaborated with Udacity to offer an online master's degree programme in computer science (Hollands & Tirthali, 2014). Despite the reduced tuition fee for students to study the programme, the financial plan of Georgia Tech indicates that its revenues will be able to cover the cost by Year 3 of the programme ('Amendment to', 2013).

#### **Educational factor**

MOOCs may facilitate on-campus education by offering educators and students a new teaching and learning model. There are successful examples showing how the implementation of MOOCs in traditional education improves students' learning performance. For example, San Jose State University experimented with a flipped-classroom model in an engineering course. Students were first assigned to watch a MOOC video lecture, fill in a questionnaire to test their understanding and review the parts they were least able to master, and then formed groups to solve the problems. At the end, 91% of the students passed the course, a substantial improvement compared with the average passing rate of 65% over the previous seven years (Oremus, 2013).

MOOCs can also be used as preparatory courses to overcome the gap between pre-university and university education. Universitat Pompeu Fabra (UPF) launched the MOOC *Descodificando Algebra* (Decoding Algebra) in March 2013, covering both the topics that are familiar to students with high school education and some difficult ones. Positive feedback was received from incoming students of UPF who had taken the course voluntarily, in terms of its usefulness in reviewing concepts or providing supplementary materials (Daza, Makriyannis & Riera, 2013).

#### **Research factor**

MOOCs serve as an opportunity for institutions to explore new pedagogical models and innovate in teaching and learning. The University of Exeter states that 'the educational techniques and technologies used in MOOCs can also be applied to on-campus blended learning and distance learning programmes, potentially improving [their] existing modules' (University of Exeter, n.d.). The University of New South Wales (UNSW) also claims that it can 'incorporate some of the best online teaching practices and technological advancements into degree programs taught at UNSW, benefiting all [its] students and enriching their educational experience' (UNSW, 2013).

The large datasets generated by students' activities in MOOCs may provide insights into online pedagogical models. They not only reveal students' access to course materials, but also their interaction with instructors and other learners (Booker, 2013). Harvard University and Massachusetts Institute of Technology, through providing MOOCs, have taken the opportunity to understand how students learn and to improve their oncampus education (Li & Powell, 2013).

### 3.2 Other advantages

Table 2 summarizes other advantages of offering MOOCs suggested in the literature. They revolve around strengthening an institution's relationships with potential partners and stakeholders.

Advantage	Source
To strengthen the institution's relationships with potential partners and stakeholders	
<ul> <li>Partnerships with copyright holders</li> </ul>	• Nanfito (2013)
• Partnerships with leading companies/ organizations	• Heussner (2013)
<ul> <li>Collaboration with other institutions</li> </ul>	• OpenupEd (n.d.)

 Table 2
 Other advantages of offering MOOCs

By providing MOOCs, institutions have opportunities to form partnerships with copyright holders. In the eyes of publishers, the large quantity of MOOC learners represents a potential market. Copyrighted materials recommended by course instructors may have their visibility raised, or even give a boost to sales (Nanfito, 2013).

MOOC providers may also form alliances with well-known companies and organizations in order to stand out from the crowd (Heussner, 2013). For example, Udacity and ALISON have collaborated with high-profile organizations to provide online courses (ALISON, 2014; Udacity, 2014).

Institutions may also ally with others in providing MOOCs for enhancing their competitiveness. For instance, OpenupEd, as a pan-European initiative jointly established by 12 higher education institutions, claims that by joining the partnership, institutions may enjoy extra visibility, have opportunities to engage in collaborative research work, and have the option of using a partner's platform (OpenupEd, n.d.).

## 3.3 Threats of not offering MOOCs

Institutions need to consider how the provision of MOOCs elsewhere might weaken their strategic position. Table 3 summarizes the threats of not offering MOOCs. If an institution chooses not to occupy a position in presenting MOOCs, it will find it harder to enter the market once the other institutions have negotiated their relationships with students and drawn up alliances in this new domain (Bell, 2013). By providing MOOCs, the leading universities may further enhance their brand image and gain favourable publicity (Kedem, Puchalla, Nelson & Behr, 2012). These universities may be perceived as being generous and prestigious, which may widen the gap between them and the other institutions.

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Threat	Source		
Being excluded from the market	• Bell (2013)		
Widening the gap between the leading universities and other institutions	• Kedem, Puchalla, Nelson and Behr (2012)		

## 4 Deterrents

## 4.1 Institutional justifications

For institutions choosing not to offer MOOCs, their justifications focus on the uncertainty of learning effectiveness for students (Table 4). For example, the University of Oxford stated that the MOOC phenomenon may be a 'lemming-like rush'. As it has been providing students with extremely good one-to-one or two-to-one learning experience through tutorials, it does not see the need for offering MOOCs at this point (BBC News, 2013). The Master of Trinity College, Cambridge University, also mentioned that seminars and tutorials cannot be replaced by MOOCs (Murphy, 2013).

In particular, the ways of teaching and learning in MOOCs present problems for instructors and students. The lack of instructor's support has been identified as an obstacle to effective learning in the MOOC environment (Hew & Cheung, 2014). Given the huge discrepancy between the availability of instructors and the massive number of students, little individual attention may be devoted to each student, which may gradually affect the students' learning outcomes.

Deterrent	Example
Uncertainty of enhancing learning	• University of Oxford (BBC News,
effectiveness	2013)
	• Trinity College, Cambridge
	(Murphy, 2013)

#### Table 4 Deterrent to offering MOOCs

The massive number of students also results in extensive amount of information in the discussion forum of MOOCs, which may, rather than giving students more perspectives on knowledge, disrupt their organization of what they have learned. For instance, the course *E-learning and Digital Cultures*, which was offered in January 2013 on Coursera, attracted 21,862 active participants. The size of the student body resulted in too many discussions and interactions occurring simultaneously, which prevented the participants from catching up with the key postings and following the course schedule (Knox, 2014).

In a sense, the success of MOOCs depends largely on learners' motivation and discipline. As reported in Nanfito (2013), 88% of academic leaders believe that the lack of self-discipline is a hindrance to students' effective learning in online courses. Fischer (2014) also observed that, despite providing students with plenty of learning resources, the challenge is to give them a 'want-to-learn' motivation.

#### 4.2 Other deterrents

Table 5 summarizes other deterrents to offering MOOCs suggested in the literature which also have to be taken into consideration in MOOC provision.

Institutions need to consider the resources, capital and human labour needed to fulfil the technological requirements. The technologies provided for offering and managing courses may include learning management systems, wiki, blogs, videography, and social media (Nanfito, 2013).

Table 5	Other	deterrents	to	offering	MOOCs
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Deterrent	Source		
Technological requirements	• Nanfito (2013)		
Personnel costs	• Hollands and Tirthali (2014)		
Heavy demands on time and resources	<ul><li>Belanger and Thornton (2013)</li><li>Kolowich (2013)</li></ul>		
Low completion rate	• Clow (2013)		
Plagiarism	<ul><li>Billsberry (2013)</li><li>Li and Powell (2013)</li></ul>		

There are also personnel costs involved in the provision of courses. The relevant staff required may include faculty members and teaching assistants working in the frontline, as well as supporting technical officers and administrative staff. Hollands and Tirthali (2014) estimated that such personnel expenses may take up 75% of the total cost.

The efforts and resources required may include a considerable length of time in preparing video lectures and other learning materials, interacting with students, monitoring discussion forums, having course planning meetings and dealing with various issues while the course is active. For example, Duke University launched its MOOC *Bioelectricity: A Quantitative Approach* on Coursera in 2012. The instructor reported that more than 620 hours had been spent in eight weeks while the course was running (Belanger & Thornton, 2013). The heavy workload of teaching a MOOC may distract the faculty members from doing their on-campus work (Kolowich, 2013).

The effectiveness of MOOCs is often doubted because of their low completion rate, i.e. 13% or less for most of the courses (Jordan, 2013). Clow (2013) used the concept 'funnel of participation' to explain the high dropout rates at each stage of a course. For instance, the MOOC *Bioelectricity: A Quantitative Approach* offered by Duke University in autumn 2012 attracted 12,725 registrations, among which 7,761 watched at least one video, 3,658 took at least one quiz, 346 attempted the final exam and eventually only 313 earned a certificate (Catropa, 2013).

Institutions may also have concerns about plagiarism. There are difficulties in verifying user identity in a MOOC environment. Young (2012) reported dozens of plagiarism cases in Coursera, including even the courses without institutional credits. This may undermine the credibility of institutions, especially when granting certifications and accreditation are parts of their MOOC business model (Davis, Dickens, Leon, Sanchéz Vera & White, 2014).

## 5 Discussion

This survey has complemented the existing studies on the motivations for and deterrents to MOOC offerings by supplementing them with relevant literature support and examples of institutions. It has also revealed the areas which have not yet been adequately addressed in previous studies.

Given only a few years of MOOC development, there is very limited empirical data on the extent to which the goals behind the motivations for MOOC offerings have been achieved, or the concerns behind the deterrents substantiated. For example, although self-marketing has been found to be a major motivation for MOOC provision in this survey, at present there is no study showing the extent to which such provision has enhanced the brand image of an institution or helped it to reach the target market.

Also, the institutional justification for not offering MOOCs — that the unique values of conventional on-campus education cannot be easily substituted by MOOCs — appears to be a claim rather than an evidence-informed decision. It overlooks the potentials of MOOCs to serve as a supplement to on-campus education (Daza, Makriyannis & Riera, 2013; Oremus, 2013) which have driven some institutions to offer courses. As reviewed in Glance, Forsey and Riley (2013), 'there is no reason to believe that MOOCs are any less effective a learning experience than their face-to-face counterparts. Indeed, in some aspects, they may actually improve learning outcomes'.

The findings of this study thus suggest further investigation on whether the provision of MOOCs has led to the desired outcomes of the institutions. While the cost and resources involved in MOOC offerings have been
relatively well-studied, a clear understanding of the benefits and drawbacks of such data will enable institutions to make a more realistic estimation of the cost-effectiveness of providing MOOCs in their own contexts.

# 6 Conclusion

This study has presented a broad range of motivations for and deterrents to offering MOOCs, including institutional justifications and those suggested in the literature. It is reasonable to believe that an institution's decision of this kind has taken into consideration the relevant factors in its own setting. The various motivations and deterrents thus reflect the institutions' experience in making their decisions on whether or not to offer MOOC courses. Such experience may be applicable to other institutions in similar situations.

According to the institutional justifications, the motivations at present tend to be exploratory in nature. Providing MOOCs is seen mainly as a means of self-marketing, as well as seeking new revenue sources and experimenting with pedagogical models. On the other hand, the justifications for not providing MOOCs appear not to have adequately taken into account the potential benefits of MOOC provision. This suggests further study is needed to examine the extent to which the objectives of MOOC provision have been achieved, so as to obtain empirical evidence to substantiate the reasons behind institutions' decisions.

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# Use of analytics in education: A systematic classification

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Abstract: The technology to collect and analyse a huge quantity of data has enabled educators to trace meaningful patterns that can capture and predict the learning behaviours of their target groups and the performance of their institutions. It has been increasingly used in academia for the past decade. Two common terms, 'learning analytics' (LA) and 'academic analytics' (AA), have often been utilized in somewhat overlapping or confusing ways to describe the varying extent of coverage of analytics in education. A number of frameworks, not necessarily mutually exclusive, have also been proposed to classify and elaborate on the different application levels of analytics in education. Nevertheless, no common agreement has been achieved on the definition and categorization of these types of analytics. In view of this, the authors have attempted to build on existing ideas and establish an integrated framework by re-classifying and elaborating on the various levels and scopes of analytics in education. The proposed framework classifies six functioning scopes (learner, course, departmental, institutional, regional and national, and international levels) and three operational levels (micro-, meso- and macro-levels) of AA and LA, and reconceptualizes the two terms. It demonstrates that descriptive and predictive reports can be generated at each level to facilitate effective decision-making by institutions as well as their staff and learners. The proposed framework provides a common ground for the exchange of ideas in this particular domain of practice. With a systematic classification, it is hoped that a better understanding of the use and application of analytics can be facilitated in the educational setting.

**Keywords:** analytics, learning analytics, academic analytics, predictive analytics, open education

# 1 Introduction

Analytics has been increasingly deployed by educational institutions to review or assess performance and competence. It helps educators to make decisions for promoting student success and enhancing institutional administration and operations, and potentially revolutionizes academia. Analytics, as defined by Davenport, Harris and Morinson (2010), is the collection and analysis of data to inform optimal decision-making. Put in the context of education, it is the analysis of sizeable data to enhance students' and institutional performance. Sizeable data, especially those that are loosely organized or acquired from many different sources which can hardly be managed by traditional databases, have been termed 'big data' (Davenport, 2013). The advances in various computational techniques have made possible the collection, management and analysis of big data (Wagner & Ice, 2012). These techniques have the potential to capture and analyse the behaviours of a huge population rather than a small sampling group (Clow, 2013).

The business sector and other industries have been using analytics and big data techniques to turn most data input into strategic output (Clow, 2013; Wagner & Ice, 2012). Nevertheless, the use of such technology is relatively new in the education sector. There is still a long way for educators to go in order to fully unleash the underlying potential of analytics in education (Baer & Campbell, 2012; Goldstein & Katz, 2005; Siemens, 2012).

In open education institutions, many of their educational delivery and teaching and learning processes are captured well in data in the servers of learning management systems (Bagarinao, 2011). The data may offer huge amounts of information, advising educators how their students learn and how their education system performs (Wise, Zhao & Hausknecht, 2014; Scanlon, Mcandrew & O'Shea, 2015).

# 2 Analytics in education

The emphasis on performance management and the use of quantitative metrics in academia have added momentum to the wide adoption of analytics in education (Clow, 2013). Educational technology applications in learning management systems (LMS) and virtual learning environments (VLE) have been utilized extensively, producing huge volumes of data about students' learning behaviours for analysis (Clow, 2013). In addition, the maturing techniques for analysing big data have made feasible the interpretation of these digital breadcrumbs (Clow, 2013). These circumstances, reinforcing one another, contribute to the increasing use of analytics in education.

Goldstein and Katz (2005) introduced the term 'academic analytics'<sup>1</sup> (AA) to refer to the use of big data techniques in the education sector. Another term 'learning analytics' (LA) came into use in 2009 to describe the application of analytics for improving teaching and learning (Bienkowski, Feng & Means, 2012). Though the term LA tends to be used to describe the analyses of learning behaviours, little consensus has been reached in defining analytics-oriented terms used in the academic world. AA and LA have been defined in various ways at diverse levels. Some writers, such as Campbell, DeBlois and Oblinger (2007), restrict the focus of AA to the areas of teaching, learning and student success. However, others — for example, Goldstein and Katz (2005), Douglas (2012), and Ferreira and Andrade (2014) — define AA as something similar to business analytics, which centres on the performance of institutions in all aspects. Long and Siemens (2011), being more specific, identify three operational levels of AA (institutional, regional, and national and international levels) to illustrate its scale of use.

With less controversy, LA is believed to be learner-oriented which specifically focuses on pedagogical issues. One can find similar definitions in Barneveld, Arnold and Campbell (2012), Cooper (2012), Siemens and Baker (2012) and Clow (2013). However, Moore (2005) and Johnson, Smith, Willis, Levine and Haywood (2011) argue that LA, other than assessing students' learning effectiveness, can be used to measure the competence of institutions in academic aspects. Evidently, there is no general agreement on the nature and functions of AA and LA, and for the development and fruitful discourse in the field, the inconsistencies in using the terms should be minimized.

<sup>1</sup> The term 'academic analytics' was first used by WebCT (Goldstein & Katz, 2005).

Despite the fact that there are discrepancies between existing definitions of AA and LA, these two types of analytics remain as the basic classifications adopted in the literature to differentiate the varied scopes and functions of analytics in education.

# 3 Classifications of analytics in education

A number of frameworks have been proposed to break down analytics in education into levels, or to represent the relationship and interaction between AA and LA (Buckingham Shum, 2012; Long & Siemens, 2011). For instance, Long and Siemens (2011) classify analytics in education into two types (LA and AA) according to their scale of coverage (course, departmental, institutional, regional, and national and international levels). Also, Buckingham Shum (2012) proposes a framework that defines LA into micro-, meso- and macro-levels analytics. In this conceptual frame, microlevel analytics focuses on individual user actions (and hence individual cohorts of students); meso-level analytics specializes in the institutional level (and could serve as a tool for managing the business of an institution); and macro-level analytics incorporates data from a geographical region (covering data generated from institutions), which is facilitated by the data integration and benchmarking methodologies practised in non-educational sectors (ibid.). Barneveld, Arnold and Campbell (2012) propose a conceptual model that illustrates the relationship of LA, AA and predictive analytics. In this model, LA specializes in enhancing learning effectiveness; AA looks into the performance of education institutions in a business setting; and predictive analytics focuses on forecasting and informed decision-making.

With insights from the above studies, an integrated framework can be construed by reorganizing and elaborating on the existing classifications of analytics in education. In this framework, AA is defined as the extensive use of data and business intelligence (BI) tools to measure the effectiveness of institutional management (including, but not limited to, teaching and learning) (Barneveld, Arnold, & Campbell, 2012; Goldstein & Katz, 2005). As for LA, this framework adopts the commonly cited definition offered in the1st International Conference on Learning Analytics — learning analytics is 'the measurement, collection, analysis, and reporting of data about learners and their contexts, for the purposes of understanding and

optimizing learning and the environments in which it occurs' (Siemens, 2010, 2013).

As shown in Figure 1, this framework illustrates that analytics can operate in six scopes, namely learner, course, departmental, institutional, regional, and national and international levels. It can also perform analysis at three levels, namely micro-, meso- and macro-levels. With these scopes and levels defining the data collection sources and target areas to work on, LA and AA can be done systematically. The scopes and levels can be defined on an expanding scale, from the bottom to the top of the framework.



Data acquisition, processing and analysis

Figure 1 Extent of coverage of analytics in education

Analytics in education operating at different levels may serve diverse interest groups and have distinctive functions. The roles and functions of analytics at each level serve to construe the meaningsof LA and AA and thus define them. As illustrated in Figure 1, the extent of coverage of analytics in education can be defined from the smallest scale (personal or individual learner level) to the broadest (international level). The figure also illustrates the analytical process that proceeds from data acquisition, processing to analysis.

Analytics operating at the learner-level focuses on individual learning performance and efficiency (Siemens *et al.*, 2011). Course-level

analytics emphasizes the conceptual development, learning progress and performance of the cohort of students (Long & Siemens, 2011). Departmental level analytics, performing micro-level analysis, helps educators to trace students' patterns of success/failure and evaluates the operational excellence of programmes (Johnson, Smith, Willis, Levine, & Hayes, 2011; Moore, 2005).

Analytics operating at these three scopes perform micro-level analysis, which generates information most useful to learners and those who are responsible for their academic performance (Brown, 2011; Buckingham Shum, 2012). Analysis performed at this level tracks and interprets data that are associated with students' learning, aiming to capture, understand and intervene in the learning behaviours of students. The object of analysis can be discourse that has taken place, and learning environment, learning goals and habits of students, and students' utilization of learning resources (Johnson *et al.*, 2011; Moore, 2005; Siemens *et al.*, 2011). Hence, analytics at these levels are regarded as LA, which specifically emphasizes the optimization of the learning environment and students' learning performance (Brown, 2011).

As shown in Figure 1, analytics operating at departmental level can perform both micro- and meso-levels analysis. Since educational institutions are engaged in the business of delivering learning, learning effectiveness to them is not merely a learning measure, but also a business measure (Moore, 2005). Depending on how the findings of analyses are used and what purposes they serve, the operating scope of departmental analytics may vary. Therefore, departmental level analytics, other than providing valuable insights into learners and teaching staff, can also be valuable information for departments and faculties in decision-making processes (Siemens *et al.*, 2011). For example, departmental level analytics can offer information about the usage of certain learning tools or materials, which indicate their cost-effectiveness by incorporating costing information into the analysis. It can also tell how well individual staff have performed by, for example, comparing the resources the staff consume with students' learning behaviour patterns, and staff inputs with students' learning performance data.

Institutional level analytics can be used to evaluate the productivity of various units and teams. It generates details for capturing the institution's

strengths and weaknesses, and thus marketing units, administrators, and funders of the institutions may find analytics at this level helpful (Buckingham Shum, 2012; Siemens *et al.*, 2011).

Analytics at the departmental and institutional level can perform mesolevel analysis, which requires data that extend beyond students' academic profiles. The size of the student body the institution serves, scholarly accomplishments and the ranking of the institution are some of the institutional data that meso-level analytics may need (Douglas, 2012). Financial data of an institution can also be an object of analysis, such as the institution's expenditures on facilities, research, staff and students, and the amount of investment, funding and aid it receives (Campbell, DeBlois & Oblinger, 2007; Douglas, 2012). Availability and utilization of institutional resources (e.g. library resources, instructional resources and information technology) may also be measured.

Regional level (state/provincial) analytics focuses on systems comparison, quality control and standard-setting — the kinds of data which local governments and policy-makers may need when forming new policies (Siemens *et al.*, 2011). National and international level analytics targets improving the nationwide (or even worldwide) quality of education. This level of analytics requires cross-national collaborative efforts and operates at a much larger scope. League tables, national governments and international organizations, such as UNESCO and OECD, are potential users of analytics at this level (Siemens *et al.*, 2011).

Analytics at the regional level or above carries out macro-level analysis. Cross-institutional information, longitudinal data or data with a state-wide sampling size (or beyond) are possible objects of analysis (Buckingham Shum, 2012). Analytics that performs analysis at meso- and macro-levels tend to be perceived as AA, since their primary goal is to evaluate the performance of institutions and, in an extended sense, academia. In addition, datasets collected at meso- and macro-levels, instead of focusing on the activities of individual learners, look into departments, faculties, institutions or even nations.

The framework suggested doesn't propose a clear demarcation regarding the coverage of AA and LA since their borderline is by nature obscure. For instance, administrators may use analytics to align teaching and learning approaches with the institution's business goals, in which case it would be difficult to say whether it is the application of AA or LA. One important aspect to be noted is that analytics at different levels and scopes interact with and enrich each other, and function as a cohesive system. For instance, data generated at low levels may provide high-level analytics with finer-grained details (Buckingham Shum, 2012). This explains why the borderlines between different types, levels and scopes of analytics are not always clear-cut and may sometimes converge. This is also the reason why, in Figures 1 and 2, the gradual change of LA at micro-level to AA at higher or broader levels is illustrated in grayscale.



Figure 2 Use of analytics in education

Other than illustrating the extent of coverage of analytics in education, the framework shown in Figure 2 has integrated the products of analytics endeavours, including the production of descriptive reports, predictive reports and information for decision-making.

LA and AA go through the process of data acquisition, processing and analysis to generate information that can be descriptive and/or predictive. Analytics can be descriptive in the sense that it identifies what has happened in the past, helps to produce reports and spots potential issues (Davenport, 2013). Going a step further, users can employ past models to

predict the future (Eckerson, 2007). Variables identified in the descriptive report provide researchers with the foundation to test a particular dependent variable and form predictive modelling (Davenport, 2013). All these efforts are motivated towards the same goal — application, in other words, to drive decision-making processes.

## 4 Discussion

Analytics has been receiving increasing attention in the academic field. The extensive use of LMS and VLE, together with the invention of massive open online courses (MOOCs), have produced a huge amount of learners' data that support the development of analytics in education. There is likely to be a growing number of research projects exploring this domain. Nevertheless, little consensus has been reached on how various types of analytics in education are to be defined. To facilitate communication and comparison of results, it is necessary to have a framework that establishes a common language on the topic to ensure accuracy in the exchange of ideas and concept-building (Barneveld, Arnold, & Campbell, 2012; Ferreira, & Andrade, 2014). The framework proposed in this paper can be used as a reference to decide which levels and scopes of analytics a study applies, who it should have effects on, and what terminologies could be used when work is to be transformed into words. Institutions, with this framework, can also identify the potential for further development.

Taking the Course Signals project of Purdue University as an example, the project developed a student success system that provides real-time feedback to each student in the course by predictive modelling (Arnold & Pistilli, 2012). The predictive model was set up based on four dimensions of data collected — up-to-date student performance in the course, effort spent (defined by their activities in Blackboard Vista and Purdue's LMS), past academic records and demographic characteristics (*ibid*.). Signals with different colours are sent to a student, indicating his/her predicted performance in the course, with a red light signalling a high chance of failure, a yellow light denoting potential problems of succeeding and a green light reflecting a high chance of success (Clow, 2013). Other than posting signal lights, instructors may also intervene by sending the

students email or text messages, calling for face-to-face meetings and referring them to academic advisors (*ibid.*). The project increased student success in individual courses and student retention in the university (Arnold & Pistilli, 2012). Referring to the framework proposed in this paper, it can be seen that the project is an application of learning analytics which focuses specifically on the individual's (and hence the cohort's) learning performance and effectiveness. It goes through learner- and course-levels processing and performs micro-level analysis. Predictive models, translated into course signals, were used in the project to drive the decision-making process (i.e. interventions to improve student performance).

Academic Analytics, LLC is a company that provides universities in the USA and UK with datasets to compare and enhance their scholarly research efforts ('Academic Analytics, Home', n.d.). The Academic Analytics Database (AAD), developed by the company, consists of the profiles of over 270,000 faculty members, coming from more than 10,000 departments and 9,000 PhD programmes of over 385 universities in the USA and other countries ('Academic Analytics', What we do n.d.). The company also collects data from other academic units, such as centres, institutes and federal laboratories that are not included in the Departments and PhD programmes (*ibid*.) The data collected fall into four major categories: 'publication of scholarly work as books and journals', 'citations to published journals', 'research funding by federal agencies' and 'honorific awards bestowed upon faculty members' (ibid.). The database allows institutions to identify the strengths and weaknesses of their academic disciplines. Using the proposed framework to study this case, we can see that the AAD aggregates the data collected from departmental level or above and performs macro-level analysis. It demonstrates the functions of academic analytics and generates descriptive reports for institutions which are buying their services, allowing the institutions to trace their positions in national quartiles and set benchmarks for themselves.

In addition, this framework manifests the interactive relationships that exist between the different levels of analytics. It reveals the blurred borderline of AA and LA caused by the special nature of education institutions as a business which delivering knowledge. It also illustrates how analytics produced in various scopes can be aggregated and add power to each other (Buckingham Shum, 2012).

With this framework, one can easily spot who the stakeholders are in this new domain of practice. Analytics will play an important role in education in the future since it will be useful in a broad range of areas, such as the evaluation of pedagogy, curriculum planning and the improvement of student support services. Its scopes of influence may reach not only learners and institutions, but also national governments, regions and or even the world as a whole.

# 5 Concluding remarks

Analytics can be deemed one of the technological advances revolutionizing the utilization of data for enhancing educational experience and learning effectiveness. It can be a source of inspiration to educators and instructional designers, helping to improve students' acquisition of knowledge and skill, as well as various aspects of institutional performance. As an emerging landscape in education, analytics has a great development potential. Various terms have been introduced to describe the activities in this new domain, but there is no common agreement on the definitions and usage of these terms. Ambiguity and inconsistency will hinder effective idea exchanges in the field. This paper, by reorganizing and reconceptualizing existing analytics-related terms and ideas, has attempted to establish a common language in the practice and research on analytics in education.

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# 4

# The impact of vicarious failure as a pedagogical strategy in modelling the behaviour of adult learners in open and distance learning

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Abstract: Face-to-face meetings in the blended pedagogy model remain an important platform for teaching and learning. This paper investigates whether the vicarious failure (VF) instructional strategy, which is a form of vicarious learning (VL), enhances adult students' understanding of the subject-matter in a face-to-face tutorial. Vicarious learning- also known as observational learning - is defined as learning that occurs through appropriate observation or the analysis of other correct solutions. On the other hand, vicarious failure refers to learning from the unsuccessful problem-solving efforts of others. We are particularly interested in knowing if adult learners learn better by looking at unsuccessful problemsolving efforts of their peers. A total of 21 adult learners participated in the study. The students from the control group [know as the 'productive failure (PF) group'] produced solutions to a problem targeting one concept in programming (the 'if-else' selection concept) that they had not yet learned; and the VF students evaluated these solutions. The findings suggest that adult learners from the control group model better from their own unsuccessful solutions rather than from those of others, provided appropriate consolidation lecture on the targeted concept has been given after the generation activity. The detailed results are discussed in the paper.

**Keywords:** adult learners, distance learning, productive failure, vicarious failure, vicarious learning

# 1 Introduction

Blended learning normally encompasses face-to-face tutorials, online learning and self-managed learning (Poon, 2013; Fadzil & Latif, 2010). Face-to-face (F2F) interaction in the blended pedagogy remains an important component of open and distance learning (ODL). In a survey by Zoraini, Ahmed & Harun (2004), using adult learners from Open University Malaysia (OUM), the majority of the OUM learners preferred F2F learning. There are various teaching and learning processes that can be used in F2F classes. When learning a new concept via F2F interaction, do adult learners comprehend better from their own unsuccessful problem-solving efforts or by looking at the unsuccessful problem-solving efforts of their peers? What are the discussion patterns when adult learners attempt to solve problems and when they evaluate botched problem-solving efforts by their peers? To what extent is critical thinking involved in these two scenarios? This paper examines these questions by focusing on productive and vicarious failures in an IT course.

#### 1.1 Productive failure

According to Kapur (2010), letting learners persist, struggle, and even fail, at tasks that are complex and beyond their skills and abilities may in fact be a productive exercise that enhance their learning process later. Kapur defines this as a productive failure (PF) instructional design, and advocates delaying support for the learners during the learning process — the more they struggle, and even fail, while trying to master new information, the better they are likely to recall and apply it later (*ibid*.). This is supported by Van Lehn *et al.*'s (2003) finding which suggest that it may well be more productive to delay the teaching support given to the students until the student reaches a form of failure. Their research shows that there is a relationship between structure and failure which should be applied in the teaching and learning process by using the PF instructional strategy.

#### **1.2 Vicarious failure**

Vicarious failure (VF) refers to learning from the unsuccessful problemsolving attempts of other learners (Kapur, 2013). VF, which is rooted in vicarious learning, is defined as learning that occurs through appropriate observation or analysis of others' correct solutions. That is, if PF is a set-up that allows students to learn from their own failed problem-solving efforts, then VF is a set-up that gives them an opportunity to study from the failed solutions of their peers.

#### 2 Purpose

The aim of this study is to design a productive failure instructional cycle for adult-based interactions in a face-to-face tutorial and compare it with a vicarious failure group. We wanted to determine whether adult learners learn better by studying the failed problem-solving efforts of their peers or or their own unsuccessful problem-solving attempts. To achieve this, two classroom-based, quasi-experimental studies with first-degree level adult learners were carried out; each study targeting a 2-hour tutorial class.

# 3 Method

The research approach adopted for this study is discussed in the subsequent sections.

#### 3.1 Participants

The participants were 21, second-year adult learners enrolled in the Bachelor of Information Technology programme at Open University Malaysia (OUM). They were drawn from two programming classes (11 students from one and ten from the other) taught by the same instructor with an average age of 33. They were of average ability, based on their prior knowledge of programming determined by a pre-test question during the first tutorial. The students had limited or no experience of the targeted programming concept — an '*if-else*' statement — prior to the study.

#### 3.2 Research design

The research design for this study was adopted from Kapur (2010). A quasiexperimental design was used, with one class (n = 11) assigned to the PF condition (control group), and the other (n = 10) to the VF condition. For each condition, the amount of instructional time spent on the targeted concept was held constant at two hours. Before the unit, all students took a 20-minute, four-item pre-test (Cronbach alpha = 0.82) as a measure of prior knowledge of the targeted concept. There was no significant difference between the two conditions on the pre-test, with p = 0.675. At the end of the two-hour tutorial classes, all the students took a post-test (which is described later in this paper).

The productive failure (PF) group (n=11): The instructor given the students freedom to form sub-groups, resulting in five sub-groups (one triad and four dyads). In the PF instructional design cycle, the groups took 45 minutes to work face-to-face on the ill-structured problem. No extra support or scaffolds were provided during the group or individual problem-solving. The ill-structured problem scenario, for the concept *if*-else selection, acted as a stimulus for learning and represented a platform for the learners to engage in collaborative learning in their group. A consolidation lecture was held towards the last 45-minutes of the class, with the teacher leading a discussion on the targeted concept. One ill-structured problem scenario was developed for the concept on the 'if-else' statement.

**Vicarious failure (VF) group (***n***=10):** As in the PF group, the instructor allowed the students freedom to form sub-groups, which produced five sub-groups (all dyads). The VF group were treated in the same way with the PF group as described earlier. However, students in this group were asked to evaluate the solution from the PF group. In this "study and evaluation" phase, the students study and evaluate solution generated by the PF group instead of generating their own solutions. One of the incorrect solutions from the PF group was randomly chosen and given to the VF group for their evaluation. At the last 45-minutes of the tutorial, a consolidation lecture was conducted by the instructor.(refer Table 1).

Table 1 PF versus VF groups

PF Group	VF Group	
Pre-test	Pre-test	
1st phase		
<b>45 minutes:</b> Generating solutions	<b>45 minutes:</b> Study and evaluate the solution provided by the PF group	
	45 minutes: consolidation lecture	
2nd phase		
45 minutes: consolidation lecture	30 minutes: Post-test	
30 minutes: Post-test		
Total: 120 minutes (2 hours)		

Immediately after phase 1, all students from the PF and VF groups took a survey to assess their engagement and mental effort when evaluating or attempting to solve the problem. Finally, all the learners from both groups were required to take a post-test after the consolidation lecture.

#### 3.3 Data sources and analysis

The data analysis procedures are described in this section. The problemsolving process by the adult learners (for both the PF and VF groups) were analyzed using both process and outcome measures with quantitative means at the group and individual levels. Because the productive and vicarious failures rested heavily on the nature of group dynamics, a multipronged group-level analysis was undertaken using the following methods:

- 1 Engagement and mental effort
- 2 The sequential patterns of the discussions
- 3 Critical thinking ratio (CTR)
- 4 The post-test result.

Methods (1) and (2) above are the process measures, and (3) and (4) measure the group and individual outcomes. We audio-taped the discussion of one randomly chosen PF and VF group. The transcripts of these recorded discussions were analyzed in order to perform the sequential analysis and to calculate the CTR.

# 4 Results

#### 4.1 Group solutions by the PF group

All the sub-groups of the PF group came up with a solution, but they did not answer the requirement of the problem. Based on the analysis carried out by the instructor, no group submitted an acceptable solution.

## 4.2 Engagement and mental effort ratings

Immediately after generating the solution (for the PF group) and evaluating the solution (for the VF group), all learners took a 5-item, 5-point (*strongly disagree* to *strongly agree*) Likert scale engagement survey and reported individually their amount of mental effort used on a 9-point rating scale created by Paas (1992). The PF group reported higher engagement and mental effort in attempting to solve the problem compared with the VF group, as indicated in Table 2 below. However, the difference between these groups (for both engagement and mental effort) were not significant at p<0.05 on the non-parametric Whitney-Mann test.

Engagement survey (Maximum score: 5)		Mental effort rating (Maximum score: 9)
PF learners	4.55	7.64
VF learners	4.34	6.28

Table 2 Individual engagement and mental effort ratings

# 4.3 Sequential analysis

It is interesting to investigate the patterns of discussions of the two groups, which can be done using the sequential analysis technique. Sequential analysis treats each interactional unit as an observation; and a coded sequence of these observations forms the problem-solving sequence in a group discussion (Erkens *et al.*, 2003). It detects the various non-random aspects of the interactional sequences to reveal how certain types of interaction follow others more often than one would expect by chance (Wampold, 1992). This is done by identifying statistically significant

transitions from one type of interactional activity to another (Bakeman & Gottman, 1997; Wampold, 1992). In order to perform the sequential analysis, we have used the lag-sequential analysis (LSA) tool known as the Multiple Episode Protocol Analysis (MEPA) developed by Gijsbert Erkens (http://edugate.fss.uu.nl/mepa). In this study, we adopted the functional category system (FCS) — an interaction coding scheme developed by Poole and Holmes (1995) as the indicators for LSA. In FCS, every utterance was segmented into one or more interaction unit(s), and coded into categories as shown below:

- *Problem analysis* (PA): Statements that define or state the causes behind a problem (e.g. 'I think I must declare the variable here')
- *Problem critique* (PC): Statements that evaluate the problem analysis statements (e.g. 'How can you be sure that the variable must be declared here')
- *Orientation* (OO): Statements that attempts to orient or guide the group's process (e.g. 'Let's take turns giving our ideas')
- *Criteria development* (CD): Statements that concern criteria for decision-making (e.g. 'We need to plan the class programme first')
- *Solution development* (SD): Suggestions of alternatives, ideas, proposals for solving the problem (e.g. 'Use the second approach to solve the problem');
- *Solution evaluation* (SE): Statements that evaluate alternatives and give reasons, explicit or implicit, for the evaluations (e.g. 'Yes, but how do we know that there should be three methods')
- *Non-task* (NT): Statements that do not have anything to do with the decision task (e.g. 'Why not continue tomorrow!').

All these categories were used in the sequential analysis, using MEPA. We excluded non-task (NT) messages in the transcript analysis, such as sociallyoriented postings as well as other discussion messages that did not convey a clear meaning or direction. As the analysis of these recorded discussions is tedious and time-consuming, we analyzed only one randomly chosen PF and VF sub-group. The results of LSA using MEPA are given in Figure 1.



PA: Problem Analysis PC: Problem Critique CD: Criteria Development SD: Solution Development SE: Solution Evaluation

Figure 1 Likely sequential patterns in the PF and VF groups

In Figure 1, a circled category means that a group in that condition was at least twice as likely to sustain that type of activity in a coherent cluster rather than it being spread throughout the discussion. It can be concluded from Figure 1 that the PF group had a focused discussion on criteria development and solution development, with problem analysis and problem critiques spread throughout the discussion. This group was also likely to have PA-PC and a perfect PA-CD-SD interactional sequence. On the other hand, the VF group only touches on three components, namely problem analysis, criteria development and solution evaluation, with only solution evaluation having a focused discussion. This group was also likely to have only a PA-SE interactional sequence.

## 4.4 Critical thinking ratio (CTR)

One of the objectives of this paper is to quantify the critical thinking ratio of the groups' discussion. In order to do so, we followed the Newman content analysis model. The theoretical concepts that support Newman, Webb and Cochrane's (1995) instrument are group learning, deep learning, and critical thinking. Newman *et al.* (1995) argue that there is a clear link between critical thinking, social interaction and deep learning, and they developed a content analysis instrument based on Garrison's (1991) five stages of critical thinking. They identify ten categories: relevance, importance, novelty, outside knowledge, ambiguities, linking ideas, justification, critical assessment, practical utility, and width

of understanding. For each category, a number of positive and negative indicators are formulated and most indicators are fairly obvious opposites (Newman *et al.*, 1995).

Newman *et al.* (1995) adopt themes as the unit of analysis, which can be used in domain-specific discussions, such as programming. The units may be phrases, sentences, paragraphs or messages illustrating at least one of the indicators. They only mark and count the obvious examples, and ignore less clear indicators. The formula used to calculate the CTR is:

 $CTR = (x + - x -) \div (x + + x -)$ 

*x*+: is the count of statements contributing to critical thinking for the coding category

x-: is the count of statements detracting from critical thinking for the category.

The minimum value of CTR is -1 (all uncritical thinking, all surface-level learning) and the maximum is +1 (all critical thinking, all deep-level learning). Overall, the critical thinking ratio can be calculated by counting all the positive and negative postings in the forum and then applying the above formula. We have analysed the same groups used in the sequential analysis (i.e. one PF sub-group and one VF sub-group, both chosen randomly). The overall critical thinking ratio calculated for these groups is in Table 3.

Table 3 Overall CTR of the groups

PF group	VF group
0.77	0.63

This result shows that both groups have commendable critical thinking ratios, but the PF sub-group has a higher CTR than the VF sub-group.

#### 4.5 Post-test result

The post-test targeted the content/concept (i.e. the 'if-else' selection structure) covered during the two-hour tutorials for both the PF and VF groups. Students from both classes were given 30 minutes to complete a

5-item post-test (Cronbach's alpha = 0.76) comprising four well-structured knowledge-based problem items (in the form of multiple-choice questions) similar to, but not the same as, those in the pre-test, as well as one item on a higher-order application-based problem. Students needed to write brief program codes for this question. The results of the post-test are given in the following table.

	Post-test results		
Question type	PF students (n=11)	VF students (n=10)	
Knowledge (Maximum score: 10)	6.64	3.67	
Application (Maximum score: 4)	2.68	1.33	
<b>Overall</b> (Maximum score: 14)	9.32	5.00	

Table 4 Post-test results

Adult learners from the PF group have higher mean scores for both the knowledge and application-based questions. Overall, the PF group had a higher mean score than the VF group, with the difference being significant at p<0.05 on the non-parametric Whitney-Mann test.

# 5 Discussion

This study was designed to compare a productive failure instructional design with a vicarious failure group, in an effort to find out whether adult learners learn better by looking at failed problem-solving efforts of others or trying to solve problems on their own. The conclusions from the study suggest that, despite seemingly failing in their collective effort, students from the productive failure condition significantly outperformed their counterparts from the VF group on the targeted concept in the post-test. The students from the PF group also compared well with the VF group on various aspects of their discussion (as highlighted in the sequential analysis) and had a higher CTR, which showed that adult learners perform

better when they persist in problem-solving activity by attempting to solving the problem on their own, even when they fail, as long as a consolidation lecture is given after their problem-solving activity.

The productive failure instructional design has enabled the adult learners to generate and develop their own arrangements and alternatives to solve the problems (Kapur, 2010). The process of generating a diverse set of arrangements while exploring the problem and solution may have augmented sufficient knowledge differentiation even though it did not result in a successful solution (Kapur, 2010). According to Kapur, generation of the solutions by the students themselves may be the better approach because the students who generate their own solution are well positioned to better understand the affordances and constraints of their own solution during the consolidation lecture than those who evaluate the given solution. Thus, students who generate the solutions on their own may be better prepared to learn from the consolidation lecture conducted by the instructor at the end of the tutorial.

# 6 Implications of the study

Though it is difficult to draw implications from one study, with a small sample, we believe the findings from this research have some broader ramifications. We have identified some broad implications that can be concluded from this study in the context of open and distance learning.

For adult learners, who constitute the majority of those involved in open and distance learning, their key characteristics are that they are selfdirected, have a problem-centred orientation to learning, and have life experiences as a rich resource for their learning (Sellers, 2010; Shin, 2012). However, open and distance education courses are usually characterized by a strong structure which students follow through a predetermined sequence of learning activities. The cost of producing distance education learning materials involves high up-front costs, which can only be justified if it serves a large number of students over the years — and so an individualized approach to adult learners may not be possible. However, most open and distance learning institutions have provided a high-quality, holistic learning environment for their learners through a blended pedagogical methodology that incorporates aspects of e-learning, distance education and traditional learning through self-managed learning, online learning, and face-to-face interaction.

Open and distance learning provides opportunities for working adults to further their studies without having to leave their jobs. With the assistance of a learning platform, learners also are more flexible in undergoing their courses, regardless of where they are when they are not attending tutorial sessions.

During these face-to-face sessions, different pedagogical strategies can be used, as seen in this case study which looked at productive failure and vicarious learning. In this research, the PF group struggled with defining, analyzing and solving the problems compared with their counterparts who studied and evaluated solutions generated by the PF group. An integral proposition from this perspective is that learners need to be engaged in solving authentic, ill-structured problems for deep learning to take place. As such problems tend to be complex and often beyond the existing knowledge and skills of learners, a certain amount of support structures, scaffolds or a consolidation lecturer has to be provided after the nonscaffolded group discussion.

# 7 Summary

The findings from the study do give us indications although it was conducted using a small sample. This research presents evident that adult learners learn better from their own unsuccessful problem-solving efforts. It is suggested that this research should be extended to more learners in the ODL mode to draw concrete conclusions about the effects of asking learners to solve problems without any scaffolding.

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# **5** Training needs assessment of teaching staff in open universities and dual-mode higher education institutions in Asia

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Abstract: As the faculty staff in most open and distance (ODL) institutions are drawn from conventional face-to-face teaching institutions, the ODL institutions normally adopt in-service training for staff development. Recognizing the importance of training, the Commonwealth of Learning organized a roundtable on 'Training distance educators' in 1990; and staff training needs at the regional level were first articulated in 1994 in a workshop on training organized by the Commonwealth of Learning. Due to technological advances, and new ways of learning and professional development opportunities, it is important to undertake a systematic training needs analysis of teaching staff serving distance education (DE) in Asia. This study will help in designing appropriate training programmes and improve performance goals in the distance teaching institutions.

This paper reports on the findings of an online research survey conducted among the faculty of distance teaching institutions located in Asia. The survey focuses on: (1) the importance of training; (2) the perceived gap in competencies; (3) the immediate and long-term training needs; and (4) preferences for the mode of training. The objectives of the study are to identify the gap between current levels of competencies of teaching staff, and to establish priority areas for training. The results indicate that respondents prefer training programmes outside their organizations, and also short online programmes of one-week duration. The research also lists area of priority for training: developing/using open educational resources; open content licensing/copyright; the design and development of educational multimedia; designing flexible skill training programmes; quality assurance; emerging trends and technologies in ODL; developing online learning/e-learning content; ICT-based delivery systems (e.g. the use of LMS); research methodology for ODL; and costing ODL.

Keywords: training needs, open universities, teacher competencies, Asia

# 1 Introduction

There has been a phenomenal expansion of distance education (DE) in Asia in the last four decades. There are about 70 single-mode open universities in Asia, catering for the largest number of adult learners around the world. Many Asian higher education institutions are also increasingly using distance and online learning to provide increased access to quality education. The use of information and communication technology (ICT) in DE has been increasing due to the affordances of the technology to support its inherent nature — supporting education anytime and anywhere. This demands changing roles for faculty staff in designing and delivering DE programmes. While there is a growing acceptance and use of technology by teachers, there is also a strong need to provide faculty members with upto-date training to become more effective in imparting knowledge through open and distance learning (ODL). As the faculty in most ODL institutions are drawn from conventional face-to-face teaching institutions, the ODL institutions normally adopt in-service training for staff development. The quality assurance in ODL becomes more complex with the additional tools of ICT (Rashid & Iqbal, 2010). The teaching staff in ODL institutions are the backbone of quality teaching and learning support. Recognizing the importance of training, the Commonwealth of Learning organized a roundtable on 'Training distance educators' in 1990; and staff training needs at the regional level were first articulated in 1994 in a workshop on training organized by the Commonwealth of Learning. Due to technological advancement, and new ways of learning and professional development opportunities, it is important to undertake a systematic training needs analysis of teaching staff serving in Asian ODL systems. It is necessary to understand their current knowledge, skills and attitudes so that appropriate strategies can be developed to improve their performance.

Asia is the world's largest continent and has more than 60% of the world population, and the majority of adult learners belong to this region. Also, it has more than 70 single-mode open universities, apart from many dual-mode teaching institutions that use distance and online learning systems to deliver education. ODL institutions need to remain up-to-date in technology and pedagogical practices to stay competitive and serve the needs of their learners. Therefore, continuing professional development (CPD) for teaching staff is crucial for every ODL institution. It has been argued that notable improvements in education almost never take place in the absence of professional development (Guskey, 2000).

# 2 Review of the literature

A review of training needs assessment (TNA) studies shows that the literature is dominated by 'supply-led' players — that is, trainers and academics with an unexpectedly strong emphasis on the demand-led aspects of organizations, especially their business results and growth (Chiu *et al.*, 1997). After reviewing the TNA literature, Ferreira and Abbad (2013) found a lack of agreement on approaches to measuring training needs, and highlighted the need for building a theoretical framework for TNA.

Rouda and Kusy (1995) proposed the following steps for TNA: (1) performing a 'gap analysis'; (2) identifying priority areas; (3) identifying the causes of performance, problems and opportunities; and (4) identifying possible solutions and growth opportunities. They further stated that training is the only answer to attaining the desired level of solutions if problems exist in the organization. Also, in a study of the pre-service training needs of teachers, Romi and Yoma (2006) found that gender influenced both attitudes and self-efficiency beliefs.

A comprehensive training impact study in the Commonwealth by Lockwood and Latchem (2004) suggests that ODL training in developing countries has to follow a mixed mode of delivery, imparted through external as well as local staff developers using both print and online materials.

Faculty staff expressed mixed views on methods of training. They preferred workshops provided by overseas and/or regional or national experts in DE,

followed by distance training provision, Internet/web-based training, and computer-based training. The important topics for training identified were: curriculum and course development; instructional design/scripting for audiovisual material; managing open and distance learning systems; and establishing quality assurance methods. In addition, the following topics were identified as important areas: the costing of ODL; assessing learner performance and diagnosing learner needs and circumstances; instructional design/scripting for print; tutoring/counselling; and evaluating outcomes (Lockwood & Latchem, 2004). A study by Okonkwo (2012) revealed that, while educators are eager to receive training on OER, they are not necessarily integrating OER within the context of teaching and learning. The study emphasized that there was an urgent need for professional development of educators to promote OER effectively.

In the literature, there are not enough studies on TNA at a regional level in the field of ODL. The present study, therefore, is timely and appropriate for assisting ODL institutions to prioritize CPD and develop relevant training programmes.

# 3 Objectives of the study

The objectives of the study are to: (a) identify the gaps between the current levels of competencies of teaching staff, and (b) identify priority areas for training.

# 4 Research methodology

The survey was conducted with the main focus on the teachers of ODL institutions located in Asia. An online survey instrument was administered to a purposively selected sample of 968 teachers working in ODL institutions located in India, Pakistan, Bangladesh, Malaysia, Maldives, Sri Lanka, South Korea, Thailand and Indonesia during May and June, 2014. The questionnaire was divided into the following nine parts.

Part 1: Personal profile of respondents

Part 2: The importance of training

Part 3: Self-rating of competencies
Part 4: Teachers' immediate training needs Part 5: Long-term training needs Part 6: Training needs of colleagues/co-workers Part 7: Training type preference Part 8: ICT access and use Part 9: Teachers' comments/suggestion related to training.

The researchers developed this conceptual framework — which shows the necessary dimension for effective performance — on the basis of their working experience as teachers in ODL systems. The questionnaire was pilot tested with 16 ODL teachers in institutions in India, Sri Lanka and Malaysia. Some items in the instrument were re-designed after receiving their comments before administering the questionnaire online.

Only 61 completed questionnaires were received by 31st July, 2014, but follow-up emails produced another 23 responses. However, some respondents had skipped some of the questions, and therefore the analyses are based on the responses to the specific questions. As the response rate was low, we understand that it would be difficult to generalize the results of the study. However, given this limitation, and taking into account the responses from the diverse groups, the findings can be considered representative of the population surveyed. Nevertheless, the paper is based on a preliminary analysis of the data, and we are yet to analyse all the variables, especially the country data.

# 5 Results and discussion

## 5.1 Respondents' profile

The results presented in Table 1 show that 37.97% of the respondents were middle-level academics, followed by entry-level academics (34.12%) and senior-level academic (27.84%). In terms of discipline, the respondents came from a wide variety of areas: Social Sciences (32.8%); Management and Commerce (16.4%); Sciences (14.9%); Engineering and Technology (10.5%); Humanities (9.0%); Computers and Information Science (7.5%); Health Sciences (4.5%); and Agriculture (4.5%). As regards gender, the respondents were almost equal, with 51.9% male and 48.1% female. The

majority had a PhD qualification (54.4%), followed by post-graduation (34.2%) and MPhil (12.3%). A quarter were in the age group 31–35 years, with 21% in the age group 41–45 years, 20% between 36-40 years, and 15% in the age group 46-50 years. The respondents had substantial years of experiences in the ODL institutions with 44.87% having 2-5 years and 29.49% having 6-10 years of experience in their present institutions. While over 85% had more than a total of 6 years of teaching experience, for teaching through ODL about 51% had less than 5 years, and the rest had over 5 years of experience. The respondents were quite representative in terms of age, experiences, and gender. About 80% had also received some kind of specialized short-term training in DE, though only about 40% had a formal qualification in ODL.

### 5.2 Importance of training in ODL

The survey responses indicated that teachers in ODL institutions consider training as an important activity for all the areas of DE. While very high importance was not accorded to all of the topics in the aggregate data, the respondents did give high importance to many of them (see Table 2). The only area that received a score below 3.5 was 'basic television production', which indicated that respondents considered this of average importance, perhaps due to the easy availability of low-cost video cameras. Moreover, the video production skills needed in DE have been undergoing changes with the use of short, less than ten-minute lectures.

## 5.3 Self-rating of competencies

We tried to find out how the respondents rated their own competencies for the important areas of training identified. While self-ratings do not show an accurate skill-gap in the understanding of individuals, they are important as a predisposition to participate in a suitable training programme. Also, as the study did not intend to identify individual respondents, there is a strong possibility of respondents' self-reflection in the results of the items in the questionnaire. For analysis of the responses, we interpreted a low mean score as 'low competency', and therefore a high need for training in that particular area. Table 3 lists the areas where the respondents rated themselves below 'Good', meaning that they are either satisfied with their competencies or their skills need improvement in that particular area. The areas on which respondents felt deficient included open educational resources, eLearning, and production for audiovideo, radio, and multimedi. It is interesting to note here that 'basic television production' received the lowest score for competencies, though respondents also rated this as the least important area. This is not really contradictory, as we believe that a low rating of competency in this area is congruent with their thinking about this topic being less important.

### 5.4 Short- and long-term training needs

Tables 4 and 5 show the immediate and long-term training needs expressed by the teachers. Training on developing online/eLearning content emerged as the top priority area for short-term needs, and quality assurance as a long-term need, which also featured in the short-term needs list. This showed their concern for the quality assurance of ODL courses. Similarly, emerging trends in ODL, ICT-based delivery systems, and research methodology featured on both the tables, indicating the need for training in these areas on an ongoing basis. The areas of OER and open licensing also featured in the immediate training needs, showing the readiness of the respondents to undergo training in these areas, if suitable training programmes are available. The teachers also expressed an immediate need for training in the areas of A/V production, and instructional design, which affect their day-to-day work. However, the long-term training needs were more in areas such as managing ODL systems, collaboration, project management, and costing, which are more aspirational as they will be useful for career progression in the administration and management of ODL systems.

### 5.5 Preferred types of training

The data presented in Table 6 show that the majority of the respondents preferred study tours to reputable ODL organizations, and wanted to attend training outside their own organization and country. While visiting other organizations is a good way of learning best practices, contextual

adaptation has been a major problem. We see increased choices for training in another institution/country as a 'tourist' approach, illustrating a lack of faith in the capacities of internal staff developers in ODL institutions. Nevertheless, the respondents showed interest in a variety of training programmes, which was highly encouraging as this would allow the use of a **balanced approach to staff development programmes acceptable to staff**.

We also tried to understand the preference for the duration of training programmes in both face-to-face and online environments. About 45% of the respondents preferred 4–5 day training programmes, followed by 1–3 days (26%), 6–10 days (13%), 11–15 days (10%) and more than 15 days (7%). About half of the respondents (49.3%) preferred online training programmes of about one week's duration, while 33.3% indicated they would attend online training programmes of 2–4 weeks duration. The respondents also gave a very high preference to online courses conducted by in-house faculty, other reputable faculty/organizations and online synchronous and asynchronous workshops.

### 5.6 Accessibility and use of ICT

The use of ICT in ODL system is increasing day by day. Teachers can guide, teach, take tutorial classes and monitor their students' performance through ICT. Therefore, they need continuous enhancement of their knowledge and skills for ensuring quality within ODL systems. Access to and use of ICTs are necessary for participating in any online training programmes. Table 7 shows high access to computers and the Internet by the teachers. Many used smartphones, and accessed the Internet using broadband and mobile connections; and there were also active users of Web 2.0 tools. Table 8 also shows that the respondents were advanced level users of email Web search engines, word processing, and presentation software. While these findings could be due to the fact that the data in the study were based on an online survey, and therefore the participants had more ICT skills, the findings also indicate that they are basic level users of LMS, Web 2.0 tools, and digital audio-video editing tools that have become essential for teachers in ODL systems.

#### Table 1 Respondents' profile

Respo	ndents' Profiles	Percentage
Desig	nation and position (n=79)	
(a)	Middle–level academics	37.97
(b)	Entry-level academics	34.12
(c)	Senior-level academics	27.84
Teach	ers subject/discipline for teaching (n=67)	
(a)	Social Sciences	32.84
(b)	Management and Commerce	16.42
(c)	Sciences	14.93
(d)	Engineering and Technology	10.45
(e)	Humanities	8.96
(f)	Computer and Information Science	7.46
(g)	Health Sciences	4.48
(h)	Agriculture	4.48
Gend	er distribution (n=81)	
(a)	Male	51.85
(b)	Female	48.14
Highe	st qualification (n=73)	
(a)	PhD	53.42
(b)	MPhil	12.32
(c)	Post-graduation	34.24
Age-g	roup (n=81)	
(a)	26–30 years	4.94
(b)	31–35 years	24.69
(c)	36–40 years	19.75
(d)	41–45 years	20.99
(e)	46-50 years	14.81
(f)	51–55 years	7.41
(g)	56–60 years	7.41
(h)	61–65 years	1.23

Emplo	Employed at the present university/institute for (n=78)			
(a)	Less than one year	7.69		
(b)	Between 2 to 5 years	44.87		
(c)	Between 6–10 years	29.49		
(d)	Between 11–15 years	8.97		
(e)	More than 15 years	8.97		
Total	teaching experience (n=81)		_	
(a)	Below 5 years	13.58		
(b)	6–10 years	34.57		
(c)	11–15 years	24.69		
(d)	16–20 years	12.35		
(e)	21–25 years	11.11		
(f)	Above 25 years	3.70		
Teach	ing experience through DE (n=80)		_	
(a)	Below 5 years	51.25		
(b)	6–10 years	31.25		
(c)	11–15 years	11.24		
(d)	16–20 years	2.50		
(e)	21–25 years	2.50		
(f)	Above 25 years	1.25		

Answer options	Response count	Mean
Understanding of open, distance and online learning	81	4.40
Understanding learner needs and circumstances	80	4.46
Setting course objectives	80	4.26
Curriculum/ Course planning and development	81	4.40
Instructional design/ writing print materials	81	4.35
Designing flexible skill training programmes	81	4.14
Editing of print materials	81	3.98
Scripting of AV materials	80	3.84
Design and development of educational multimedia	80	4.04
Online learning/ eLearning	80	4.15
Developing/Using open educational resources (OER)	80	4.09
Basic audio/radio production	80	3.53
Basic television production	81	3.43
Computers and Internet skills	80	4.33
Academic counselling	80	4.14
Student support services	81	4.19
Assessment of learner performance	81	4.25
Library and information management	81	3.79
Costing open and distance learning	80	3.66
Programme and course evaluation	81	4.21
Management of open and distance learning	81	4.14
Quality assurance	80	4.39
Research methodology for ODL	80	4.29
Training skills	78	4.19
Teleconference and presentation skills	80	4.03
Interpersonal skills	81	4.04
Leadership skills	79	4.09
Time management	81	4.21
Project management	80	4.10
Copyright	80	4.16
Helping students to be self-directed learners	80	4.40

Table 2	Importance	of various areas	of training related to	o distance education
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Answer options	Response count	Mean
Designing flexible skill training programmes	79	2.97
Scripting of AV materials	78	2.38
Design and development of educational multimedia	78	2.41
Online learning/eLearning	77	2.68
Developing/Using open educational resources	78	2.65
Basic audio/radio production	78	2.12
Basic television production	77	2.08
Library and information management	78	2.73
Costing open and distance learning	77	2.40
Copyright	76	2.86

 Table 3
 Areas of low self-rating of competencies in ODL (below 'Good' ranking)

 Table 4
 Top short-term (6–12 months) training priority areas

Areas of priority	Percentage	Frequency
Developing online learning/eLearning content	42.9	36
Emerging trends and technologies in ODL	39.3	33
ICT-based delivery systems (use of LMS, etc)	34.5	29
Design and development of educational multimedia	31.0	26
Quality assurance	29.8	25
Developing audio/video materials	29.8	25
Instructional design/writing print materials	22.6	19
Developing /using open educational resources (OER)	21.4	18
Open content licensing	21.4	18
Designing flexible skill training programmes	19.0	16
Research methodology for ODL	19.0	16

Areas of priority	Percentage	Frequency
Quality assurance	36.9	31
Emerging trends and technologies in ODL	26.2	22
Managing ODL systems	21.4	18
Collaborative models of content/ programme development	21.4	18
ICT-based delivery systems (use of LMS, etc)	20.2	17
Research methodology for ODL	19.0	16
Project management	19.0	16
Costing open and distance learning	17.9	15
Curriculum/ Course planning and development	17.9	15
Developing online learning/eLearning content	17.9	15
Community development and extension	17.9%	15

#### Table 5 Top long-term (36 months) training priority areas

 Table 6
 Respondents' rating of preference for the type of training modes

Answer options	Number of responses	Mean
In-house workshop by in-house faculty	67	3.46
In-house workshop by external faculty	66	3.98
Workshop outside your institute, but in your country	66	3.85
Workshop outside your institute, outside your country	65	4.24
Teleconference based workshop	68	3.43
Self-learning through print materials	64	3.59
Self-learning through multimedia CDs	65	3.75
Self-learning through web-based resources	66	3.70
Online courses conducted by in-house faculty	67	3.28
Online courses conducted by other reputed faculty/ organization	67	3.97
Online but synchronous workshop	67	3.53
Online and asynchronous workshop	63	3.39
Attachment to reputed ODL organizations	67	3.91

Study tours to reputed ODL organizations	67	4.15
Project based training	66	3.98
Joining massive open online course (MOOC)	66	3.78

#### Table 7 Access and use of ICT tools

ICT Access and Tools	Frequency	Percentage
Use of computer (n=71)		
Daily	69	97.2
Alternate days	1	1.4
Irregularly	1	1.4
Place of access to computer (n=71)		
Office	5	7.0
Home	3	4.2
Both office and home	63	88.7
Use of Internet (n=71)		
Daily	67	94.4
Alternate days	2	2.8
Irregularly	2	2.8
Place of access to Internet (n=70)		
Office	8	11.4
Home	1	1.4
Both office and home	61	87.1
Type of Internet connection (n=71)		
Dial-up connection	8	11.3
DSL connection	20	28.2
Leased line (wired)	14	19.7
Leased line (wireless)	15	21.1
Mobile devices	14	19.7
Mobile device access (n=61)		
Simple mobile	20	29.0
Smartphone	47	68.1
Tablet (Phablet)	2	2.9
Use of Web 2.0 tools (n=66)		
Blogs	29	43.9
Wikis	26	39.4
Social bookmarking (e.g. delicious, Digg)	8	12.1
Video sharing (e.g. YouTube, Vimeo)	29	43.9
Presentation sharing (e.g. Slildeshare)	36	54.5
Social networking (e.g. Facebook)	52	78.8

ICT competencies	N	Mean
Word processor (e.g. Word)	70	3.97
Spreadsheets (e.g. Excel)	70	3.67
Presentation (e.g. PowerPoint, Prezi, etc.)	70	3.96
Email	70	4.30
Using search engines	70	4.03
Databases	69	3.51
Multimedia authoring	70	2.87
Graphic editing	70	2.39
Digital audio	69	2.30
Video editing	70	2.06
Webpage design	69	2.09
Learning management system	69	2.64
Web 2.0 tools (wikis, blogs, social networking and sharing tools)	70	2.81

Table 8 Comfort level regarding the use of computer related activities

### 5.7 Common priority areas

The study found that using ICTs effectively is the major training need of the teachers in ODL institutions. While they prefer training outside their organizations, and study tours, they do have high access to technology, and are also willing to join a variety of training programmes, including online training programmes of one-week as preferences. We have presented aggregate data for the study, and believe that the planning and development of training programmes in the institutions need further local understanding of the needs and requirements. However, our analyses of the results clearly show a pattern of needs in the Asian ODL institutions. Table 9 shows the top priority areas for training needs to focus on for developing the capacities of teachers in ODL institutions in Asia.

Areas of priority training needs	Short- term	Current deficiencies	Long- term
Developing /using open educational resources (OER)	Yes	Yes	
Open content licensing/copyright	Yes	Yes	
Design and development of educational multimedia	Yes	Yes	
Designing flexible skill training programmes	Yes	Yes	
Quality assurance	Yes		Yes
Emerging trends and technologies in ODL	Yes		Yes
Developing online learning/ eLearning content	Yes		Yes
ICT-based delivery systems (use of LMS, <i>etc.</i> )	Yes		Yes
Research methodology for ODL	Yes		Yes
Costing open and distance learning	Yes	Yes	Yes

#### Table 9 Common priority training areas

# 6 Conclusion

In conclusion, the findings of the study indicated that respondents prefer training programmes outside their organizations, and also online programmes of a short one-week duration. The study also listed the area of priority training: developing/using open educational resources; open content licensing/copyright; the design and development of educational multimedia; designing flexible skill training programmes; quality assurance; emerging trends and technologies in ODL; developing online learning/ eLearning content; ICT-based delivery systems (use of LMS, *etc.*); research methodology for ODL; and costing ODL.

As the data analysed are based on the respondents' views from the few ODL institutions in Asia which responded to our questionnaire, the results of the study may not be generalized, and should be treated as preliminary findings. However, the study has contributed significantly to understanding the training needs of teachers in Asian ODL institutions. The findings suggest that policy-makers, and trainers in ODL institutions, need to develop capacity-building programmes that are relevant and appropriate to the needs of their teachers. Education and training is an investment in people, and we believe this will lead to their empowerment, which is the key to success (Aslam, 2000). Therefore, as the technology keeps changing, ODL institutions need to focus on the priority training areas and offer opportunities to their teachers for continuous professional development. The results of this study are an indicator of the key training needs, which would strengthen the development of appropriate training programmes.

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# The development of an online course on leadership development and change management for nurse executives in ASEAN countries

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Abstract: In 2015, the ASEAN Community, a coalition of ten Asian countries, will combine regional efforts to improve the quality of healthcare and nursing services. The purposes of this research are to develop and evaluate the online training course entitled 'Leadership Development and Change Management for Nurse Executives in ASEAN Countries', which is an innovative distance learning programme. The training course was divided into two phases: (1) an online course composed of ten modules relating to leadership development and change management; and (2) an intensive face-to-face seminar. This paper only presents the online course. Seventy-four participants enrolled in the course, but only 37 evaluated the online course through electronic mail. The research findings showed that the online course consisted of four components: input, process, output, and outcome; and most participants were satisfied with the course in terms of enhancing their knowledge and new experience, as well as building networking for ASEAN nurses. However, further research is needed to develop programmes for learning online, and to address issues such as module accessibility, poor local infrastructure, self-disciplined learners, and limitations of language and culture in communication.

Keywords: online learning, leadership development, change management, nurses, ASEAN countries

## 1 Introduction

In 2015, the ASEAN Community, a coalition of ten Asian countries, will combine regional efforts to improve the quality of healthcare services. The ten member countries are Thailand, Indonesia, Malaysia, the Philippines, Singapore, Brunei Darussalam, Cambodia, Lao PDR and Vietnam (Association of Southeast Asian Nations, 2014). For training development, cooperation in promotion, including interaction between personnel and professionals in the region, is considered significant in achieving the ASEAN Community's goals of awareness of caring and well-being in the regional community (Yeoh & Ee, 2014). As an important part of the health service profession, nursing, one of seven key services, has been accelerated by the ASEAN Community by combining together to establish a global quality service. In this regard, an agreement was reached in principle — in the ASEAN Mutual Recognition Arrangement on Nursing Services (MRA) — that nurses who meet the required qualifications are eligible to register or apply for nurse licences to work in other ASEAN countries by law and regulations. Therefore, nursing personnel development is necessary in the ASEAN region.

With the current changes in the knowledge-based society, prior to entering the ASEAN Community, preparation for coping with international market competition and understanding the ASEAN Community — particularly its economic, social and cultural aspects — is crucial for further progress and the survival of the health and nursing organization (Giri *et al.*, 2012). Every nurse, especially nurse executives, must keep up with continuous learning, so that they can handle the changes mentioned above, and make use of them for their organizational and professional benefit by fulfilling their leadership potential — the core competency of nurse executives whose self-development is truly needed.

Sukhothai Thammathirat Open University (STOU) uses distance education (DE), including technological instructional media via the Internet (i.e. e-learning and webcasting). Being fully aware of the significance of the development of nursing personnel, the STOU School of Nursing, therefore, organized a pilot online training course on 'Leadership development and change management for Nurse Executives in ASEAN Countries'. To overcome obstacles such as geography and time, the DE mode was used in this study to train ASEAN's nurses for practice.

# 2 Literature review

Online learning is a form of distance education that provides learners with opportunities to engage in lifelong learning for personal development without the restrictions of time and space. Reinckens, Philipsen and Murray (2014, p. 700) state that 'Online learning is growing as an option for nurses who want to continue their education in order to improve patient care outcomes, advance their careers, and contribute to a more effective and efficient health care system'. Some educators have reported that online learning has certain limitations in building social interaction and its quality is not as rigorous as its face-to-face counterpart (Palloff & Pratt, 2011). However, research by Thomsa and Eryilmazb (2014) found that online learning could build up social interaction among students. Effective online courses should be able to build up strong social connections among learners, as well as provide richness of course content. In addition, not only the accessibility of online courses, but also connectivity, flexibility, and the ability to promote varied interactions, is needed (Moore, Deane & Galyen, 2011).

O'Neil, Fisher and Newbold (2009) point out that DE can be totally online or partially online (blended learning), and can be synchronous or asynchronous (see also Sowana, & Jenkins, 2013). Furthermore, it has been found that Webs are providing access to rich information, encouraging meaningful interactions, and bringing people together (Siritarungsri & Suwanasamrit, 2011; Wilson & Lowry, 2000). Learning theories are concerned with the actual process of learning, not with the value of what is being learned (Siemens, 2005). In a networked world, the very manner in which information is acquired is worth exploring. Siemens advances a theory of learning that is consistent with the needs of the 21st century. He asserts that learning and work-related activities are no longer separate. Therefore, based on Siemens' theory, the development of an online course must integrate theory and practice, and utilize an online 'knowledgesharing' forum as a strategy to connect people together. According to Siemens (2005), the principles of connectivism are as follows.

Learning is a process of connecting specialized modes or information sources. Nurturing and maintaining connections is needed to facilitate continual learning. Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.

Siemens further indicates that connectivism also addresses the challenges that many corporations face in knowledge management activities. In addition, Sittia, Sopeerakb and Sompongc (2013) supports the view that an instructional model based on connectivist learning theory via web-based learning is also appropriated and raises the level of problem-solving skill among students.

Personnel development for nursing by DE will, therefore, allow nurses to learn through a pedagogy based on connectivism in response to their needs, regardless of time and place. Nurses from various countries in the ASEAN Community may require different approaches due to their ability to access technology, and language and cultural communication.

In this project, the course evaluation was based on that of the Monterey Institute for Technology and Education (MITE, 2010). The MITE online course evaluation consists of seven components: (1) course developer and distribution models; (2) scope and scholarship; (3) user interface; (4) course features and media values; (5) assessments and support materials; (6) communication tools and interaction; and (7) technology requirements. The course evaluation in this study aims to investigate the views of participants who had taken part in the online course, with the specific intention of weighing up its strengths and weaknesses, and providing feedback on how it might be improved for further development of the online training course. Such an evaluation will inform and guide practical action to help improve the quality of a programme or course (Siew Hong, 2007).

# **3** Objectives

The purposes of this research and development study are to:

- 1 develop an online course to prepare ASEAN nurse executives; and
- 2 evaluate the online course implementation.

# 4 Methodology

#### 4.1 Sample and setting

A purposive sample of 74 eligible executive nurses enrolled in the online course. The criteria for entry were (1) serving as nurse executives in ten ASEAN countries; (2) having good English communication and IT skills; and (3) providing a recommendation letter from their Chief/Director. There were 49 eligible participants who studied at least one module of the online course, but only 37 sent back their evaluation forms for the online training course via electronic mail.

#### 4.2 Instrumentation

The evaluation form was composed of general information, LCM course evaluation, and five open-ended questions which asked about the strengths and weaknesses of this course; the LCM website; the numbers of modules they attended; which module they liked best with reasons; the benefits received from learning the course; and their expectations after studying the course. Three experts examined the content validity and the index was 0.8.

#### 4.3 Research procedures

The research procedures included three major steps, viz.

**Step 1:** The development of the four-month online course was based on the connectivism approach. Ten content modules based on a clear taxonomy and specific criteria were designed and presented by resource persons from various fields whose expertise contributed to each module. The content modules provided visual distinction and consistency to specific types of information, which enabled participants to learn step by step. The World Wide Web, LCM website (http://www.stou.ac.th/lcm), was utilized for supporting participants' learning and sharing their knowledge, as well as valuable experiences. Based on the Monterey Institute for Technology and Education (2010) and connectivist theory (Siemens, 2005), the development of the LCM website was supervised by the first author who has experienced of teaching and learning via the Internet, and has developed short course training at STOU for more than 20 years.

**Step 2:** Seventy four nurses in five ASEAN member countries, namely Thailand, Malaysia, Myanmar, Lao PDR and Vietnam, enrolled in the online LCM project. All of them achieved the online orientation they needed to complete three activities: (1) learning one module weekly; (2) sharing participant's knowledge and experiences gained from their learning in the knowledge-sharing forum in each module; and (3) developing a mini innovative project. At the end of this step, only 49 participants studied at least one module in the online course.

**Step 3:** The training course was evaluated by participants and returned through electronic mail.

### 4.4 Research ethics

This study was approved by the Human Research Ethics Committee of the School of Nursing, STOU, Thailand. The leader of the research informed participants about the study's purposes and procedures, and then provided research informed consent and research consent forms. Participants were informed that they had the right to cancel their permission for researchers to use their information.

# 5 Research findings

The findings of the study included two parts, as indicated below.

### 5.1 Part 1: Components of the online course

The LCM course was divided into two phases. The first phase was the online course, and the second phase was the intensive face-to-face seminars that emphasized group interaction for the development of networking and nursing administrative innovation. This paper focuses on the online course — the first phase. The LCM online course consisted of four components: input, process, output and outcome as shown in **Figure 1**.



Figure 1 The components of the LCM online course

In Figure 1, the *input components* consisted of ten modules, the LCM websites, resource persons, and facilitators. The modules were developed by resource persons from various fields, including nursing, education and management, who had expertise in the content. Each module lasted for 50 minutes. The first module served as an orientation to the online course, the LCM website, the schedule, the assignments, and the LCM course team, to enable participants to know how to learn in this course. Modules 2 to 9 involved content related to leadership and change management, which was useful for imparting knowledge and experience to the participants, enabling them to apply the knowledge they gained in their current work and be able to analyse critically, synthesize and share their reflections in the knowledge-sharing forum after completing the study of each module. Module 10 presented participants' views on best practice on the 'Leadership Competencies' for Nurse Executives in ASEAN countries. All ten modules were accessible through the LCM website.

The LCM website developed was easy to access. The technology requirements, course format and course environment were designed by a Web designer cooperating with the LCM team. The course format refers to the delivery method for the course content and how it could be accessed by the participants. The LCM website requires only Window 7 or higher for an operating system, and Internet explorer 9 or Google chrome for a browser. The course environment refers to the course management system or mechanism through which a course is taken by a participant or administered by a facilitator. Also, knowledge-sharing on the website page refers to the content and feedback provided as part of the course. Participants were encouraged by facilitators to study and share their reflections continuously in the knowledge-sharing forum following the module schedule.

The *process component* consisted of participants' learning and interaction. Communication tools, the email address (aseanstou2014 @gmail.com) and the LCM website are the tools and features that reside in the course environment that allow training participants and training facilitators to interact with one another. Participants' interaction with each module refers to the activities and assignments that they are required to complete.

The *output component* was the enhancement of participants' knowledge, experience, and satisfaction with the online course.

The *outcome component* was the result of the course. Module 10 was constructed by participants after transferring module content into their practice. The learning outcomes are innovative tasks or mini-projects that arose from studying the modules, and participants were assigned individually to prepare for attending the intensive face-to-face seminar in Thailand. Networking was also a desired outcome.

### 5.2 Part 2: Online course evaluation

The online course was evaluated by the training participants. The course was found to be appropriate for nurse development, especially for nurse executives, and could also be used for building up networks among nurses in ASEAN countries. Most participants (n=25) strongly agreed that this LCM course not only met their expectations but also encouraged them to improve their change management skills (n=22), and leadership skills (n=24). They also reported that they would recommend this programme to others.

LCM website: The training participants (n=35) said that they were satisfied with the LCM website, and agreed that the website design was attractive and easy to apply, read and participate in knowledge-sharing. The sequencing of the LCM website was considered appropriate, and they also agreed that the instructions for it were understandable. Furthermore, they agreed that any announcements were posted in a timely fashion. Finally, they knew how to contact the facilitators or the project leader.

**Content modules:** Most participants (n=33) agreed that they were satisfied with all the content modules that were developed by experts from various

countries and disciplines, and that they were well ordered; and the modules presentation was considered to be clear and inspired participants' learning. Module I, the course orientation, was found to help them to get to know 'how to learn in this course'. The content modules and their presentation (Module 2–9) were felt to be useful in imparting knowledge and experience. A number of participants (n=10) were happy with Module 10 that was constructed on the basis of participants' perspectives and presented best practice. Below are some sample comments made by participants:

This online training course is composed of 10 colourful modules that are important for nurse executives to be competent leaders. (P8 from Myanmar)

Module 1 provides very useful information to complete this online course. We can know how to, and what we are going to learn online. This made it easier to join this programme. (P23 from Thailand)

This project has covered very comprehensive information related to leadership and change management [and] the module videos were very interactive and facilitated self-directed learning skills that promote lifelong learning, which will definitely benefit the nurses leaders. ... The arrangement of the model was well organized from general to more specific. (P28 from Malaysia)

**Knowledge-sharing (online interaction):** Most participants regularly shared their knowledge and experiences via the knowledge-sharing forum after they finished learning each module. Some reported that they had spent about ten to 12 hours studying some of the modules. Most participants were very satisfied with Module 1 that guided them on how to study the online course. Also, almost all the participants (n=34) reported that they had enhanced their knowledge and experience after studying the course, and most of them (n=30) said that they were able to apply the knowledge and experience from knowledge-sharing to their practice. The learning outcomes of the online course implementation demonstrated significantly that 22 participants had transferred knowledge into their practice, and then developed 17 innovative projects based on the content modules. The research findings also showed that the learning process had been regularly contributed to and supported by the project team as

facilitators via the knowledge-sharing forum and personal emails. The online course contributed to and supported participants in transferring knowledge to improve their practice in the workplaces and organizations, as well as building up ASEAN nurses' networks. The training participants were also very impressed by the LCM team, working with effective teamwork. One participant commented:

First, I would like to thank the project leader, and all the dedicated members of the project team ... Your dedication to work has shown us your leadership and change management skills, and that is very impressive. Offering an online course for self-study, which consisted of participants from many countries, is a great deal of change in the area of nursing. ... We have learned from the best ...I think this was a great opportunity for me. (P10 from Thailand)

**Strengths of the course:** A number of participants (n=14) reported that the strength of the LCM course was ubiquitous learning, as the course was available to them at anytime, from anywhere, and they could learn and work concurrently. They considered that the course was accessible, up-to-date, well planned and organized, easy to learn, and relevant to their practical situations; and they were able to repeat any content in each module which they did not understand. Also, the content of their learning could be applied in real situations, and the assignments encouraged them to improve their leadership skills.

Weaknesses of the course: About 50% of the participants (n=17) reported that they could not find any weaknesses in the LFC course. However, some complained about the quality of the online presentation — for example, that the sound quality of some module was not clear. Also, one participant commented that some modules were rather long and time-consuming. Four participants from Myanmar informed us that no Internet service was available and a number of participants had some problems with access to the Internet that led to interruptions in their learning. However, the CD recorders that were provided later were very useful for their study of the modules.

**Obstacles or barriers:** Most participants (n=24) reported that barriers were found in module accessibility, such as the poor local infrastructure

technology, the self-discipline of the learners, and the limitations of language and culture in communication. However, regular support, mentoring and monitoring from the LCM facilitators helped them to continue participating in the course.

Suggestions: Many suggestions were made, as follows:

- 1 Learners should complete the previous modules before moving on to the next module.
- 2 The course should provide an Internet service for information search and translation.
- 3 The course should provide an exchange programme and include learners from all of ASEAN.
- 4 The course should provide study visits to study healthcare system in other ASEAN countries for comparison.
- 5 Modules should be shorter as this will make studying easier.
- 6 Implementation of teamwork should be added as an output of this course.

## 6 Discussion

The online course is an alternative way of improving professional knowledge and skills. The LCM online course was designed to meet the needs of executive nurses among ASEAN countries in order to improve leadership and change management skills. The content modules provided rich enough information to inspire participants to apply it in practice in their workplaces. Moreover, the learning activities encouraged participants to make meaningful interactions with other participants and the resource persons.

One of the key aspects of maintaining a sense of community online in this study was reflection or knowledge-sharing sessions. Phillips (2005), and Kulaklia and Mahonyb (2014) suggested that the uses of active learning strategies in online education could enhance the learning outcomes. The

main purpose of these reflective activities was to encourage participants to critically analyse what they were learning and openly share their thoughts with others on the course. Educators serving as facilitators can play an important role in promoting self-learning and achieving learning outcomes through web-based communication (He & Hu, 2012). Effective facilitators keep encouraging and supporting participants to share their knowledge and experiences openly, regularly and in a timely fashion. The similarities and differences of the individuals or community of practice were explored and discussed. It was agreed that any answers were neither true nor false, so that participants had an opportunity to learn from others from this session and freely build up their network and trust relationships. Haggerty (2009) argues that trust relationships are necessary to build up social presence and interaction between learners and teaching staff.

Effective orientation was another essential feature for the success of this online course. Though the face-to-face orientation class had not been arranged in this study, the online orientation module should be effective enough for participants to learn about the online learning environment and get ready for studying the course. However, some registered participants dropped out, perhaps due to problems with Internet access and the commitment to their current work. Williams, Gunter and Nicholas (2006) state that access, computer literacy and technical issues can be barriers to the establishment of a virtual community of practice; and this view is supported by Carter (2013) who suggests that, to overcome barriers to navigating and using the e-learning platform, orientation for students is needed. Most participants also reported that they had problems with Internet access each module, as noted above.

# 7 Conclusion and recommendation

Since the LCM project was based on a connectivist approach, the development of this online course therefore focused on the learning process and was supported by facilitators to bring people together, and build up an ASEAN network. Also, according to a principle of connectivism, it is believed that 'a right answer now, may be a wrong tomorrow'. As a

result, throughout the course, a supporting, mentoring and monitoring approach for participants by facilitators was necessary to encourage continuous involvement in the entire course.

Using a connectivist approach, emphasis was placed on the learning process, which inspires participants to apply their knowledge concurrently in their practice. Also, good learning outcomes emerged in terms of participants both gaining knowledge and experience, and building up networking among ASEAN nurses. This online course was also appropriate and effective for nurse development in the ASEAN countries. However, further research is needed to develop programmes for learning online, and to address module accessibility, poor local infrastructure, learners' self-discipline, and the limitation of language and culture in communication.

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# The rise of open and blended learning

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Abstract: Open learning strategies continue to increase in importance for university learning and teaching. The primary reasons for this growth concern ongoing debates about the costs of residential courses and the resulting economies of scale; demands for more student-centred and flexible approaches, providing students with more choices in learning; technology ubiquity, portability and their affordances, providing solutions to identified student needs; and the impact of MOOC experiences and the lessons learnt, rolling back into mainstream distance, open and residential teaching. Based on case study analysis, this paper examines 25 years of experiences across four universities in developing open and blended learning solutions for predominantly mainstream campus-based education, and identifies the longer-term impacts on changing core practices in those institutions. The first case explores the impact of distance and open education courses and course resources and activities re-purposed to replace conventional on-campus teaching; the second is a re-engineered continuing professional education course converted to distance and blended learning; the third describes how a conventional course structure, quality assurance and sustainable improvements were made through the introduction of blended and online solutions; and the fourth case explores the impact of an institution's use of MOOCs as a catalyst to effect changes in mainstream courses and programmes. Arising from the cases described, this article identifies key concepts that support improved opportunities for success in adopting open and blended learning. The paper concludes by outlining a curriculum design framework, based on recent research and practice, that facilitates sustainable and transferable improvements to learning and teaching in universities adopting open and blended learning strategies.

**Keywords:** online learning; blended learning, technology affordance, curriculum design

# 1 Introduction

For many reasons, open and blended learning strategies have become the *mot-du-jour* in delivering higher education in recent years. What this article illustrates is that quality open and blended learning has been practised in higher education for several decades. What is more important is not the delivery method itself but the underlying sound pedagogy and curriculum design. This article, which is based on a paper presented at an open learning conference (Fox, 2014), outlines case studies of good practices in open and blended learning in four universities across 25 years and concludes with an effective curriculum design framework to support future blended courses.

# 2 Case studies in open and blended learning

### 2.1 Case 1: A distance course re-engineered for blended on-campus delivery

A distance course in microbiology was developed to enable practising nurses in rural and regional Western Australia to upgrade their Nursing Diploma to degree status (Fox & Edwards, 1990). The materials developed included weekly video presentations (laboratory demonstrations and short lectures) broadcast on the Golden West Network, a regional television station, and activity-led print-based study guides and resources. Later, there was added a series of computer problem-based scenarios via augmented learning exercises (Russell, 2014), which enabled students to work through cases and make decisions on, for example, different ways of collecting and storing urine samples for laboratory analysis. The decisions students made were logged and individual feedback was given on the consequences of their decisions. The distance course was adapted for use with the Open Learning Agency of Australia (OLA) in the mid-1990s (OLA, 1993). Feedback on the course from distance students was positive, and the resources and teaching methodology used in the distance mode was considered worth adapting to support on-campus teaching (Edwards, Fox & Phillips, 1997).

The microbiology course was taught to a large number of students in health sciences, with considerably increased numbers (750) in the early 1990s. The course was a core unit, as well as a service/elective, of study for various health-related degree programmes. The distance materials were initially made available to supplement the on-campus course. The printbased study pack — which included resources for the course, activities and simple tests with feedback and answers, and links to the videos and additional references, to enable students to self-study as well as selfmonitor their progress through the course — was placed in the University bookshop and sold to students at cost. The videos and computer-based case scenarios were placed in the AV section of the library, for internal use by on-campus students. The decision to trial using the distance resources to take the place of certain components of the on-campus course delivery was made following positive data collected from students using the materials, the number of sales of the print-based study pack, and the number of uses of each of the videos held in the library (Fox & Edwards, 1990). The VHS videotapes needed to be replaced several times in each semester, due to heavy usage and subsequent wear and tear. Students were asked to review the videos for each week, and to address the activities set in the study packs, before attending the large lectures. In the lectures, students were placed in groups to discuss answers to the tasks set prior to the class and to raise questions. Areas requiring further clarification were supplemented, as needed, by a review of sections from the video. Using this method, the lectures became more interactive. Students took some time to get used to the changed format, but broadly appreciated the increased opportunities afforded for more activity, interactivity and reflection (A.I.R.) (Fox & Radloff, 1999) in the lectures and the additional support provided out-ofclass. The lectures and tutorials were not only more interactive, but enabled more detailed and enriched matters to be discussed. This approach to

teaching created new roles for lecturers and tutors; and it introduced roles for educational developers and designers, who explored and recommended the changing learning environments that took into account affordances of new technologies and new practices, and the adoption of re-engineered distance learning courses.

### 2.2 Case 2: A civil engineering first-year course converted using a personalized system of instruction (PSI)

The civil engineering course in this case study was a service/elective and a core course for a number of different programmes in Engineering, taught in the mid-1980s. First-year, second-semester students from many degrees, with varied interests, understandings, capabilities and motivations to study, were all enrolled together in the same class. The number of students in the course varied from year to year, but generally ranged between 120 and 250. To complete the course, students had to show evidence of their understanding of core components of the course by addressing tasks and problems, and answering multiple-choice and short open-ended questions, all of which were set in authentic contexts related to civil engineering.

The course was taught using traditional methods of lectures, focusing on delivering and contextualizing content, followed by tutorials, clarifying the content introduced in the lectures and providing students with opportunities to raise questions and seek help for the tasks and problems set. While this traditional method worked well when classes were composed of students with similar backgrounds and interests, and when the number of students taking the course was around 20 to 30, the shift to much larger classes of students from different degrees and with varied capabilities created major difficulties for both the students and staff teaching the course. Student feedback highlighted a number of issues in the course that could mostly be related to the broad student demographics and different student needs, experiences and understandings. For example, in the tutorials, some students required detailed help in working through the tasks, while others just needed to know how well they had done in addressing the tasks, enabling them to move onto the next stage of the course.

The course delivery was 'flipped', following the Keller Plan, also called the 'personalized system of instruction' (PSI) (Pear *et al.*, 2011). The Keller Plan, developed in the mid-1960s, provided a systematic framework for self-paced personalized distanced instruction, well suited to science, technology, engineering and mathematics (STEM) subjects and others subjects, based on structured hierarchical knowledge development and standard stepped testing procedures (Mackie, Usher & Martchenko, 2012).

Core tasks and problems in the civil engineering course were given to students prior to the start of the semester, along with a self-paced study pack about the course and the way it was delivered. In the first 'lecture', students were informed that there would be no lectures in the traditional sense, but that learners would be required to work through the various exercises in the course manual, answering the tasks and questions set. Student were told that the lecturer would still attend the lectures or at least be in the lecture hall to assist individuals and small groups that needed particular help with the staged activities. Those students who could complete the set tasks successfully on their own could submit their work for early feedback, and then move through other parts of the course at their own pace. The study pack, produced by the lecturer, provided an interactive, self-paced text, including course content broken down into small units with examples, short stories to illustrate issues and accompanying questions, diagrams and figures to help students work through all the tasks. The lecturer noted that time was needed in the first few sessions to explain and re-explain to students the format of this course and to assure them that, despite having no content-driven lectures, they could work their way through the course to successful completion. Overall, the new flipped method worked well and student completion rates, as well as grades, were improved. Students who needed help in getting through the course appreciated the opportunity given to talk to the lecturer, while those who found the course and the PSI materials easy to work through by themselves were happy to complete the course at their own pace, often well before the end of the semester, enabling them to focus on other courses they were taking that they found more demanding and needed increased effort. The greater flexibility of this course, which catered for different student interests and capabilities, was much appreciated by students, who then put pressure on other courses to adopt a similar method of delivery. Though the term 'flipped' was not used, the practice was certainly similar to recent descriptions of changed teaching. Today, with advances in technology-enhanced learning and teaching, the Keller Plan methods have become popular again, especially in the STEM disciplines.

The success of this flipped civil engineering course led to very mixed responses from academics around the campus. Some staff were very positive and adopted similar strategies themselves, while others expressed concern that this would lead to non-attendance at lectures and queried whether students could genuinely learn effectively through this method. In the years that have passed since this PSI approach was adopted in civil engineering, the same criticism is still heard concerning students missing face-to-face classes.

#### 2.3 Case 3: The main roads engineering courses

In the 1990s, engineers working for the government's main roads department required staff to complete continuing professional education (CPE) courses to update their skills and knowledge, and to keep up with changes in state and federal policy and procedures. The courses run were conducted in conjunction with a local university. The course delivery adopted a conventional face-to-face method, requiring staff to attend classes in person. A difficulty arose when increased information was included in the course and the course itself expanded to accommodate this change. However, the engineers who had to take these courses were increasingly finding it difficult to attend classes at particular times, due to increased business at work. The course coordinators were becoming more frustrated as they could not identify a time and date that would be suitable for the engineers needing to take the required courses.

An examination of the course content by instructional designers identified that new information was being added to courses but older information/ content was not being removed. In addition, the specified objectives of each course had become unclear and unconnected to course objectives as each course had increased the content. Further, the links within course components and between the courses had also become tenuous.

The solution developed by the instructional designers was to complete a curriculum mapping exercise, identifying the core business of each course, the interrelationships between course and assessment components, and how the courses related to and built on each other. Older content in the courses was removed and clear links were made between the courses (Fox & Radloff, 1999). The delivery of all the courses was blended, enabling the engineers to complete the bulk of the coursework at a distance, at home or in the office. Face-to-face classes were reduced to two two-hour sessions. Evaluations conducted identified improvements in grades, as well as better retention and pass rates. Again, this case made use of instructional designers and educational developers, as members of the teaching and support team, ensuring that the revised courses achieved the outcomes set, as well as making certain that teaching staff were provided with training and support on the changed delivery practices, which incorporated distance learning strategies.

#### 2.4 Case 4: Piloting new practices through MOOCs

In 2012, the University decided to strategically fund a selection of Massive Open Online Courses or MOOCs. The reasons for developing the MOOCs were varied, though one core purpose was to trial new approaches, practices and innovations to develop and deliver higher education, which could later be shared and, in part, adopted in mainstream on-campus residential and blended learning. In the first year of trials, the RASE (resources, activities, support and evaluation) design model was adopted (Churchill, King & Fox, 2013), along with a standard-based assessment model based on Blooms' objectives and Biggs' SOLO taxonomies (Biggs & Collis, 1982; Krathwohl, 2002) and a seven-point grade scale. Among the lessons learnt from these trials, the University was able to show the value of adopting a single curriculum design model for the MOOCs that could also translate well into more conventional on-campus teaching and the adoption of open learning strategies for residential courses. The final section of this paper outlines the design framework and the values such a model offers to higher education programmes and courses.
#### 3 The RASE model for developing courses

One core benefit of trialling MOOCs, as well as other cases in open and blended learning, is the opportunity to try out and evaluate new approaches to higher education learning and teaching. Over the last decades, different design models have been tried and tested in the cases in this paper and the RASE model builds on this previous work (Churchill et al., 2013), within an outcomes-based curriculum. An advantage of this model is that it takes into account changing technologies and their evolving affordances, while maintaining core principles that support quality learning and teaching. Fundamental to this model is that quality content and accompanying resources are not sufficient for achieving the learning outcomes, but that four interrelated core components should include: (1) resources, for example, crafted content to engage students through experiments, demonstrations, mini-lectures, or readings, etc., enabling them to learn with, not just learn from, resources; (2) activities for students to engage in using resources and working on tasks such as experiments and problem-solving, leading through experience towards achieving the learning outcomes; (3) support, including peer, course teacher and technology-platform support to help students solve emerging difficulties as they work through the course; and (4) evaluation, to provide structured information to guide and enable student' self-progress and to serve as a tool for teachers for understanding what else is needed to ensure that learning outcomes are being achieved. This four-step model supports a range of summative assessment activities to assess and provide a basis for the certification of learning. The RASE model, used in conjunction with an outcomes-based curriculum, has been trialed with blended on-campus courses as well as in the MOOC courses, and has to date enabled quality assurance and improvement within and across courses. In line with Biggs' (2014) paper on the importance of institutional constructive alignment between programmes and courses, the RASE model is now being used to assist in the design and development of programmes and courses across the University. The framework, with notes on its components, is shown in Figure 1 below.



Figure 1 RASE within an outcomes-based curriculum

Figure 1 includes the following elements.

- **Programme learning outcomes (PLOs)** prescribe the knowledge, attitudes, skills and practices that students are expected to demonstrate in completing a programme of study.
- Course learning outcomes (CLOs) prescribe the knowledge, attitudes, skills and practices that students are expected to demonstrate in completing a specific course; and CLOs articulate with PLOs.
- Learner needs are the individual student needs catered for to ensure their greatest possible engagement in learning.
- **Course components** are the combination of resources, activities, support and feedback/evaluation (formative assessments) required for the full achievement of the course learning outcomes.
- Assessments measure actual learning outcomes, and can be formative or summative.

- Measuring actual learning outcomes ensures that the students can demonstrate that they have achieved the intended learning outcomes of the course and programme.
- Strategic intent and graduate capabilities: Strategic intent establishes university-wide aspirations for all programmes, and broadly defines what students may expect to experience when undertaking a programme at a particular university. Graduate capabilities are the broad knowledge, skills, practices and dispositions that students are required to develop during their time at university; and Strategic intent and graduate capabilities are integrated within PLOs.

#### 4 Conclusion

There is an ongoing demand for adopting open learning strategies in all forms of higher education and much has been learned by researching and re-developing distance courses for open and blended learning in residential courses. Though there is no one-fits-all model for the design of the curriculum, programmes and courses, the RASE model, outlined in this paper, in conjunction with Biggs' constructive alignment (2014), is assisting in improving the quality of higher education provision in a growing number of institutions that have adopted open and blended learning strategies.

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# 8

# Revamping the learning management system to provide a successful learning experience

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Abstract: Multi-mode education is fast becoming the norm in most learning institution, especially those which offer online learning. The blended mode is the most commonly adopted mode of learning, as it provides both face-to-face interaction and online support to learners. Currently, online support revolves around the learning management system (LMS) that allows students to manage their accounts for learning online. The LMS support was related only to learning content and administrative transactions, while learning motivation was left to the students. However, with the present advances in ICT, more can be done in terms of boosting learners' engagement, providing better learning support and increasing learners' motivation. Open University Malaysia (OUM) recognizes the importance of these features, and sees the need to enhance its current LMS - which is called myVLE - to provide its learners with a better learning experience. While many enhancements have been made to the myVLE, the two most prominent ones are the forum page and a self-tracking button. In order to increase learners' engagement, the course forum has been revamped with a better interface and it now highlights three active threads at the top of the forum page. This provides quick understanding for learners and shows e-tutors what are the students' main concerns. Another important feature is the self-tracking button, where learners have the option of tracking their learning themselves; and by doing this, they are able to engage other related features. OUM understands how challenging it is to be a self-directed learner, especially when juggling work and learning. With these enhancements, OUM hopes to provide its learners with better support and motivation that will lead to a successful learning experience.

**Keywords:** open learning, open education, multimode, LMS, VLE, myVLE, learning support, OUM, Open University Malaysia, best practice

# 1 Introduction

The advances in online technology over the last decade have created new and exciting delivery models in teaching and learning, with online courses becoming more and more popular. According to Emelyanova **and Voronina** (2014) — citing **Ahmad** (2013), Boeker and Klar (2006), and Mijatovic, Cudanov, Jednak and Kadijevich (2012) — e-learning appeared at the end of the 20th century and has quickly become a new learning paradigm, having proved to be an effective educational technique. Major changes in online infrastructures, learning habits and perceptions of lifelong learning have made online learning more sustainable compared with conventional education. Some of these changes are further elaborate below.

Firstly, the Internet has become a necessity rather than a privilege, even in many developing countries. Internet access and infrastructure are faster and wider, with personal connection and public wifi readily available in most places. Secondly, the majority of the current workforce is 'connected', and Generation Y is more open and more ready to embrace this form of (online) learning. They are more susceptible to the idea of lifelong learning as an opportunity for them to move forward in their various careers. Thirdly, the introduction and popularity of massive open online courses (MOOCs) from renowned learning institutions is seen by many as the way forward. This new paradigm of bringing learning to the people instead of bringing people to learning, as mentioned by Elliot Masie of the Masie Centre, is seen as the future of education; and, because of this belief, we can see increased convergence between traditional and distance education systems. With the rise of online education, many have turned to the blended approach as a model for teaching and learning.

# 2 A blended approach

In its simplest form, blended learning — also known to some as hybrid learning (Kaleta, Skibba & Joosten, 2006) — simply means the combination of face-to-face and online learning, .though different institutions interpret the concept and the functional weighting of its components differently. For Open University Malaysia (OUM), as mentioned by Kaur (2005), the blended approach (Figure 1) comprises three components: face-to-face tutorials, online learning and self-managed learning. This has been the learning mode offered by OUM since its inception in 2000.



Figure 1 Blended pedagogy

#### 3 Learning management system

The learning management system (LMS) has evolved greatly since it was introduced in the 1990s, and today it is one of the key components in an online learning environment. With a blended approach, the institution needs to engage some form of LMS to manage all aspects of administration and learning in an online learning environment. OUM has its own in-house LMS, called the Virtual Learning Environment (myVLE) that manages all the courses it offers. With myVLE, the University is able to offer the online components in its blended approach, with features such as eContent, online submission of assignments, a discussion forum and resource links, to name but a few. However, the mode of learning remains a single approach which is the blended approach, as discussed above.

# 4 Successful learning

Before discussing successful learning, we take a look at some of the challenges learners face as online students in general, and with myVLE specifically. In OUM, the general challenges faced by 'at risk' online learners, according to Latifah, Baharom and Mohamad. (2006), are:

... time management (27%), followed by work demands (18%), and lack of study skills (16%). Lack of proficiency, particularly in Mathematics and English, also appears to be a problem. Finally, as adults, they also have to grapple with family and financial problems.

Demands specifically related to myVLE, as stated by Fadzil and Latif (2010), are that 'learners found it (myVLE) not too user-friendly: the navigation tool can be quite cumbersome and access can sometimes be quite slow'.

These challenges are directly related to the characteristics of LMS which constitute system quality, information quality and service quality. As mentioned by Al-Busaidi (2012), system quality plays a major role in the success of a LMS. System quality is related to the characteristics of a system. Researchers, such as Bailey and Pearson (1983), DeLone and McLean (1992) and Seddon (1997), have introduced several ways to measure system quality, with the common measures being response time, reliability, flexibility, accessibility and ease of use.

In order to improve system quality and increase learners' feelings of being more successful in their total online learning experience, learners' frustrations need to be eliminated by providing quicker access and better features in myVLE. Based on these assumptions, successful learning means easier webpage navigation, faster access to content, learning at their own pace and the availability of other learning support.

# 5 myVLE

Over the years, based on feedbacks from users, mainly learners and tutors, more contents and features have been added to the existing myVLE. Since the original design did not take these new additions into account, the myVLE team faced the task of thinking how best to incorporate these new features into the LMS. This had to be done with minimum disruption to the existing user interface (UI). However, the enhancements ended up more like 'patchwork', where sections are created and inserted as new buttons or whenever there is no space left on the page real estate, links were created. Besides these new additions, the existing myVLE also has to deal with new technologies, especially in the mobile segment, such as tablets and phones. The characteristics of mobile devices were not taken into account previously, simply because at that time these devices were non-existence or not so popular. These new developments have prompted OUM to relook at the existing myVLE and it was decided that a revamp was needed.

The decision to revamp myVLE came at the right time as the University is also looking at alternative ways to provide instructional support and engage learners. One of the main criteria for the revamp is to address issues expressed by learners and create more successful learning, as discussed above. The team now has a freer hand to dismantle the existing myVLE and reassemble it to meet the needs of current learners who are described as 'digital natives' by Prensky (2001).

#### 6 New changes

The most obvious change to myVLE must be the look and feel of the whole webpage. The revamped myVLE looks cleaner and has simpler navigation. The text-driven interface has been replaced by an icon-driven interface (Figure 2). One of the reasons for this move is to make the interface intuitive in order to make it more user-friendly. The use of icons fits this purpose as symbols are recognizable and easier to associate with or decipher, just like the traffic symbols we see on roads.

#### Text-driven interface

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Icon-driven interface

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Figure 2 Screenshots showing the text-driven interface being replaced by an icon-driven interface in the revamped version of myVLE

The second change made to myVLE is to address issues related to navigation, as well as content loading time. In the past, the number of clicks users made to reach the targeted content varied from one up to five. This generated some negative feedbacks from users who claimed they got 'lost' navigating to/through the content, while others said that once they got to the content, the loading time took too long. The revamped myVLE cuts the number of clicks down to three to reach any content. The team also looked at how contents are pushed to the users. Previously, learning topics were pushed by topic, meaning that users had to wait for the whole topic to load before it appeared on their screens. This has been changed, and learning topics are now pushed in 'digestible' chunks, basically according to the sub-topics found in the learning modules. Pushing learning contents in chunks helps to speed up the loading time as well as making them more manageable on smaller screens, such as tablets and especially smartphones. Users can get to the desired content quickly with the jump-menu found on top of each section (Figure 3).



Figure 3 The jump-menu

The third initiative was to provide learners with more structured learning support. The majority of OUM students are working adults who have little time to juggle the different roles they have taken up. These learners felt 'at a loss' when they missed their tutorials due to other commitments; and they also needed more support in terms of resources related to their learning. The team took all these factors into consideration and provided them with many additional forms of support (Figure 4), such as pre-posted e-forum discussion questions in their forums, additional resources related to their learning, a quick self-test to check their understanding and active reading lists that are basically hyperlinked directly to OUM's digital library. The forum page is the one that has undergone most changes, with additional features. Besides a change in format to be more 'facebook-like', the most prominent change is the addition of a new feature which highlights the three most active threads on top of each forum page in their respective forum group (Figure 5). This has received positive feedbacks from learners, as well as tutors, as they feel they can now quickly understand what the main concerns of their groups are by reading the most discussed topics.

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#### Figure 4 Learning support tabs under each topic

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Figure 5 Three most active threads highlighted on top of the forum page

The final major changes to myVLE are the ability for learners to track their own learning. Previously, learners only tracked their learning manually, by their own effort. With the new myVLE, learners can now track their learning online, in real-time. The responsibility for tracking their learning is left to the learners themselves. At the end of every content page, there is a tracking button which learners can click on (Figure 6) if they are confident that they have mastered the content there. A tracking bar appear on top of the content page indicating in percentages how much learning the learners has mastered, which gives him/her an idea of how much they have learned and how much time they have left before the examination.

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Examples of activities fou basis for the Gantt chart	ind inside a and the Ne	typical IT project are given in Table 7.1 below twork Diagram to be drawn in the foregoing se	. The given set of a ctions.	ctivities will become the		
		Table 7.1: Schedule of Activities				
	Activity	Description	Estimated Time			
	Α.	Obtain agreement on the proposed project	1 week			
	в.	Prepare & agree on the training programme	1 week			
C. Train user staff 4 week						

Figure 6 The tracking button on the bottom right corner of each content page

# 7 The full online mode

With the availability of the learning support components, learners are empowered to be more self-directed in their learning. OUM believes that with this setup, they can now provide learners with another learning mode which is known as 'the full online mode'. In this new mode, face-to-face tutorials are replaced by video lectures and physical modules are replaced by online versions which can be downloaded or printed if/when needed. In November 2013, OUM indentified eight courses to be offered using this new mode for its January 2014 semester, with another 14 courses for the May semester and 15 courses earmarked for the September semester (Table 1). In general, OUM has has received positive feedback from learners about this new learning mode. However, to date no empirical research has been done to determine the real impact on learners and its effectiveness in supporting instruction.

Semester	No. of courses
Jan 2014	8
May 2014	14
Sep 2014	15
Total	37

Table1 Number of courses offered under the Full Online Mode

### 8 Conclusion

With these new developments, OUM aims to provide learners with better learning management tools that allow them to control their own learning at their own pace. Hopefully, these new features in the revamped version of myVLE will enable them to be more self-directed and successful in their learning. The better designed webpage and the additional features available in the new myVLE also open the door for OUM to add another learning mode to its existing blended mode. These forms of support make it possible for courses to be offered in the full online mode. This not only provides learners with another choice, but also enables OUM to cut costs, especially in tutors engagement and the printing of modules. OUM hopes to study the impact of this new full online mode on students and on assessment results soon. The study will also give valuables feedback from learners to see how myVLE can be further improved to maximize their learning experience. OUM considers this initiative as part of its best practice approach because it brings positive changes to learning and learners.

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# A Cognitive Apprenticeship Approach to Teaching Organic Chemistry Online: Challenges and Opportunities

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Abstract: Organic chemistry involves the study of structure, properties and reactions of the compounds of carbon. This sub-discipline of chemistry usually requires a laboratory instruction that facilitates the students' understanding of organic chemistry. In an online learning environment, employing laboratory instruction is quite challenging. Learning chemistry by online mode may be limited to the use of either a virtual laboratory or a laboratory at a distance, both of which involve a distant mentor or a facilitator. In this paper, the authors explore the possibility of applying the cognitive apprenticeship model to online teaching of organic chemistry. The experiences of the authors in teaching organic chemistry by face-to-face and in facilitating by distance and online mode will be shared to demonstrate how the four dimensions of ideal learning (content, method, sequence and sociology) and their components are incorporated in the design and development of strategies of instruction in organic chemistry.

**Keywords:** Cognitive apprenticeship model, distance and online learning, organic chemistry

# 1 Introduction

In early years, when universities did not yet exist and when education was not yet a field of study, people learned through the process of apprenticeship in which a more experienced person (the mentor) provides examples to and assists a less experienced one (the apprentice) so that the less experienced person gains new knowledge and skills. This mentorapprentice model had been applied to learning traditional crafts in nonformal instructional environments. Recently, this apprenticeship model has gained importance and has been adapted to the cognitive or intellectual domains.

# What is Cognitive Apprenticeship?

The cognitive apprenticeship model was developed and proposed by Collins, Brown and Newman (1989) for teaching reading, writing and mathematics. According to the authors, the model is "an alternative model of instruction that is accessible within the framework of the typical American classroom. It is a model of instruction that goes back to apprenticeship but incorporates elements of schooling." (Collins *et al.*, 1989).

Cognitive apprenticeship is a pedagogical model of learning inspired by the apprentice-expert model wherein the apprentice learns through experience and practice guided by an expert of the skill. The model provides an opportunity for the apprentice to observe how experts solve complex problems. Stewart and Lagowski (2003) stated that this model "might be viewed as learning by doing; it is a sequentially guided learning process with expert models and expert feedback."

Recent studies have reported evidences that the cognitive apprenticeship model is able to enhance "students' high-order thinking abilities" and that its combination with collaborative learning resulted in significantly better problem solving performance (Kuo *et al.* 2012). The findings of Wei and Corbett (2011) suggest that the combined cognitive apprenticeship learning and cognitive tutors approach resulted substantial gains over traditional instruction. In the study of Alger and Kopcha (2010), the student teaching field experience was improved through a technology-based innovation using the cognitive apprenticeship as a framework for its design. Furthermore, the findings of Stalmeijer *et al.* (2009) suggest that this model is a useful model for teaching strategies in undergraduate clinical training and a valuable basis for evaluation, feedback, self-assessment and faculty development of clinical teachers.

This paper presents a cognitive apprenticeship approach to teaching organic chemistry. Organic chemistry is a sub-discipline of chemistry that involves the study of structure, properties and reactions of the compounds of carbon. It is an experimental science that often requires a laboratory experimentation to better understand and appreciate the concepts in organic chemistry.

# 2 Objectives

The paper aims to look into the applications of cognitive apprenticeship theory on teaching organic chemistry online. Specifically it aims to (a) demonstrate the four dimensions of ideal learning (content, method, sequence and sociology) and their components in the context of online teaching of organic chemistry, (b) employ the model in developing strategies for online teaching of organic chemistry, (c) incorporate some new trends in teaching into teaching organic chemistry, and (d) identify the challenges and opportunities of teaching organic chemistry online employing the cognitive apprenticeship model.

# 3 Methodology

This paper presents the personal experiences of the authors in teaching organic chemistry in face-to-face mode and in distance and online modes. It will deal with the authors' teaching experiences on how the cognitive apprenticeship model is employed into teaching organic chemistry. Furthermore, the authors will demonstrate the design and implementation of an online organic chemistry class using the cognitive apprenticeship model.

In the University of the Philippines Open University, organic chemistry is offered to students of the Diploma in Science Teaching (major in Chemistry) program. Current students of this program already earned an undergraduate bachelor's degree. This course is administered fully online.

# 4 Discussion

Cognitive apprenticeship constitutes four dimensions of a learning environment (Collins *et al.* 1989) namely Content, Methods, Sequence,

and Sociology. Each of these four dimensions involves various components briefly described in Table 1.

Dimension	Components of Each Dimension
1. Content (type of knowledge)	Domain Knowledge — collection of learned conceptual and factual knowledge and procedures that are explicitly identified with the subject matter
	Heuristic Strategies — "tricks of the trade"; generally effective strategies employed to accomplish the tasks involved in the subject matter
	Control Strategies — collection of the techniques and steps to direct processes to accomplish the tasks; includes monitoring, diagnostic and remedial strategies
	Learning Strategies — involves knowledge on how to learn new knowledge
2. Method (ways of learning)	Modelling — learner's observation of an expert accomplishing a task
	Coaching — an expert observes a learner accomplishing the task and provides feedback, hints, advice, assistance, support, exercises, explanations <i>etc.</i> to improve the learner's implementation of the task (scaffolding and fading)
	Articulation — the expert encourages the learner to express their knowledge through a clear and effective language
	Reflection — the expert encourages the learner to compare knowledge, reasoning and problem solving strategies with those of the expert and of the other learner
	Exploration — the expert encourages the learner to pose and solve problems on their own

Table 1         The four dime	ensions of a learning en	nvironment according	to Collins et al.	(1989)
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3. Sequence (keys to ordering learning activities)	Global to local skills — conceptualize the task first before executing the parts of the task; concept map first before details
	Increasing complexity — tasks are gradually increasing in difficulty
	Increasing diversity — practicing more problems to acquire varied strategies and skills and to emphasize broad applications
4. Sociology (social characteristics	Situated learning — learning through the context of working on realistic tasks using the acquired knowledge
of learning environments)	Culture of expert practice — engagement in the skills of expertise and active communication about ways to accomplish the task
	Intrinsic motivation — setting of personal goal to be involved in the learning process and to acquire knowledge and skills
	Exploiting cooperation — learners accomplish their set goals through working together

In teaching organic chemistry through the cognitive apprenticeship model, the content dimension should be the same regardless of the mode of teaching because the subject matter as well as the topics is constant. The sequence and sociology dimensions do not vary significantly between strategies of teaching the subject matter face-to-face and by online mode. However, the implementation of the method dimension differs for the face-to-face and the online modes of teaching organic chemistry.

#### 4.1 Content Dimension

The content dimension or the type of knowledge acquired by the students in an online chemistry class should necessarily be the same with those in a face-to-face class. The domain knowledge in particular must be constant because there is only one subject matter. Likewise, the same heuristic strategies in organic chemistry must be learned by the student regardless of the mode of teaching. Variations may occur though in the face-toface and online implementations of some control and learning strategies. Stewart and Lagowski (2003) defined the three control strategies such as monitoring strategy (strategy that help student monitor his progress), diagnostic strategy (strategy used to understand the source/s of student difficulties) and remedial strategy (strategy used to reduce or eliminate student difficulties). In a face-to-face class, the authors employ recitation techniques (question-and-answer type) to allow students check their own progress. Quizzes performed before or after a class session are also given by the authors in their face-to-face class to determine the areas at which the students experience most difficulty. The authors respond immediately to provide feedback to address the areas of difficulties encountered by the student. However, in the online organic chemistry class, the authors are quite challenged to monitor their students' progress immediately because the class is held asynchronously. To address this challenge, the authors designed self-check points for students to monitor their own progress. Furthermore, these self-check points allow the students to determine the seemingly challenging topics for them to work on.

#### 4.2 Method Dimension

Teaching organic chemistry online requires unique strategies for the implementation of the five components of the method dimension. Just like in the face-to-face class, the authors ensure that the three critical roles of a teacher (Anderson *et al.* 2001) in the learning process are performed in the online class.

As Faculty-In-Charge (FIC), the authors develop, design and deliver the course. To deliver the content and to model the skills to the students of the online organic chemistry class, the authors employ a resource-based learning approach for their students. The authors provide a list of various web-based open educational resources (OERs) and other educational materials for the students to access the knowledge and skills for a particular lesson or topic. Since the authors are not able to personally demonstrate the skills and knowledge to their students, it is important that the resources provided by the authors allow the students to learn the necessary skills. According to Dai (2004), laboratory experiments are very important for

students' understanding organic chemistry and for enhancing the students' ability to address problems.

Compared to the face-to-face classes, experimentation in an online class requires more rigorous considerations. For one, the problem and the resources must be thoroughly chosen such that students are allowed to perform particular organic chemistry experiments on their own from their local position in the absence of their FIC. This somehow posed a challenge to the authors as they must consider the availability of the chemicals and facilities that the students will have to use and the safety of the students who will perform the experiments without the actual supervision of the FIC. To address the concern of availability of chemicals and resources, carefully chosen laboratory experiments are given for the students to perform. The experiments which are necessary to demonstrate the important concepts in organic chemistry, but are hazardous and dangerous if done without the proper and actual supervision, are only shown through virtual laboratories and/or video demonstrations. A recent study of Tüysüz (2010) has shown that virtual laboratory applications resulted in positive effects on students' achievements and attitudes. However, virtual laboratories "are a useful supplement to but not a substitute for handson laboratory experience" (Wang 2009). Thus, in the future, the authors aim to produce a set of organic experiments using home experimental kits with a combination of online and hands-on learning (Brewer et al. 2013). Studies of Reeves and Kimbrough (2004) and Casanova et al. (2006) have shown that a distance laboratory class can be conducted using online resources and kitchen chemicals and that it can be used as an alternative to conventional on-campus chemistry class.

Due to the need for web-based educational resources, archiving a wide array of web-based resources for the topics in organic chemistry has been a practice of the authors to prepare for the online class. As a result, the authors' perspective of the future includes a list of relevant and useful webbased resources for organic chemistry that has been used by their students, tested useful both by the FIC and by the students, and assessed to be of good and reliable quality in terms of accuracy of the content knowledge.

The second component of the method dimension is coaching. In the online organic chemistry class, the authors offered various modes coaching

strategies to their students such as self-assessment questions (SAQs), online quizzes and graded exercises to provide assistance, support and scaffolding. The authors find that it is essential to have a well-established feedback mechanism especially for an online class where personal and synchronous contact between the teacher and the student may not exist unlike in the face-to-face mode. Furthermore, the authors also observed that a quick and immediate response and feedback are necessary to promote a more stable scaffolding of learning for the students. This somehow poses a challenge since most of the time, communication between the FIC and the students occur asynchronously.

In the implementation of the last three components of the method dimension, namely articulation, reflection and exploration, the authors employ the online discussion forums for students to participate in. The authors encourage the students to articulate what they have learned about the topic by posting questions about some topics about organic chemistry in the discussion forum page of the online classroom. A reasonable time is given for the students to respond to the posted question. During this time, students are also allowed to respond to their classmates' answers to the question. At the point where students respond to each other answers and compare their knowledge with one another, reflection occurs. The authors also employ the discussion forum as a means for exploration. In this way, the authors pose a particular situation or condition for students to address using their knowledge of organic chemistry.

#### 4.3 Sequence Dimension and Sociology Dimensions

With the teaching experiences of the authors in face-to-face and online classes, it is found that the teaching practices for the implementation of both the sequence and sociology dimensions are almost the same except for the cooperation aspect of the sociology dimension. In a face-to-face class, cooperation among students occurs even without the teachers' instruction. They spontaneously work together especially for clarification of the difficult topics. However, in an online class where students are not on the same location, cooperation is seldom successful. The students of the online chemistry class are located in various places in and out of the country, therefore there is least, if not nil, cooperation to work for a particular task. Generally, the authors do not usually employ group work for one particular class in any of their online classes.

# 4 Conclusion and Recommendations

This paper discussed the applications of cognitive apprenticeship theory on teaching organic chemistry online. The four dimensions of ideal learning namely content, method, sequence and sociology and their components were demonstrated in the online teaching of organic chemistry in UP Open University. Various innovative teaching strategies had been employed to ensure effective delivery of the content knowledge of the subject matter. Some of the online teaching strategies employed were taken from the experiences of the authors from face-to-face teaching but with modifications and adjustments appropriate for the online mode.

The authors highly recommend that the students perceptions of and experiences in the organic chemistry course be determined in the future. These will provide information whether the cognitive apprenticeship model helps them have a better understanding of the content of the course.

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# The use of web-based communication tools for enhancing the collaborative learning experience

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Abstract: A number of web-based communication tools are now available to which students can freely gain access. With the use of such social media tools, the communication among students, and between students and their supervisors/tutors, can be enhanced. These tools can improve the collaborative learning experience of students undertaking group projects, especially if they are studying in the distance learning mode. This study investigates the views of students on using these tools, as well as the impact of such usage on student learning outcomes. The study consists of two parts. The first part records the usage of web-based communication tools by the participants (project tutor and students); and the second part involves a questionnaire survey at the end of the project to collect the views of the student participants on using such tools. The results indicate that these tools have a positive impact on the academic achievement of the students involved in the study.

**Keywords:** open and distance learning, collaborative learning, group project, teaching and learning

# 1 Introduction

According to the Office of the Communications Authority (2014) of the Government of the Hong Kong SAR, there are more than 17 million mobile subscribers in Hong Kong — a penetration rate of about 240%, which is very high by world standards. The use of mobile digital devices

(such as smartphones) is very common among undergraduate students in Hong Kong, with many of them possessing their own smartphones for communication purposes. Text messaging (SMS) and electronic mail, and instant messaging (IM), such as WhatsApp and Facebook, are very popular communication tools. Yue (2014a) examined the students' reaction to the use of a typical IM tool in supervising his dissertation projects; and Yue (2014b) extended his work on the measurement of student engagement.

In many traditional or distance learning (DL) situations, undergraduate students are required to take part in some group projects which usually involve one teaching staff member and two or more students. The group members do not usually meet face-to-face frequently, but use social media communication tools to facilitate the exchange of views among them. Unlike IM tools, a Facebook group allows the posting of many other types of files, which is more flexible than IM tools for promoting group project discussion. This paper explores the use of both a WhatsApp IM group and a Facebook group facility in tutoring some group projects, with a focus on tutor-student interaction. The project tutor is positioned as a 'member' of the WhatsApp IM group and Facebook group for each project group of students.

The objective of this study is to investigate the impact of using some web-based communication tools on the learning outcomes of students undertaking group projects. Both the views and behaviour of students in using such tools are collected or tracked in the present research.

# 2 Relevant studies

# 2.1 Collaborative learning

The advances in computer network technology can benefit open and distance learning (ODL) strategies by connecting learners with distributed learning resources. Talesra (2004) points out that such technology not only enables flexible study opportunities to be provided to students, but also provides new ways for student-teacher and student-student communication, which can help to facilitate collaborative learning. Also, Bruffee (1993) states that collaborative learning aims to avoid students

becoming dependent on the teacher, who does not monitor group learning but, as a member of the group, acts more as a peer of the students — and so collaborative learning is more appropriate for university students.

### 2.2 Interactions in collaborative learning

Moore (1989) distinguishes between learner-content interactions, learnerlearner interactions, and learner-instructor interactions in the group project context. In relation to the interactions of learners in a DL context, Paulus (2005) emphasizes the individual reflections on group project experience and peer evaluations of individual group members. Johnson et al. (1981) state that collaborative learning can lead to more successful achievement than either individualized or competitive learning experiences. Also, Latchem and Jung (2010) discuss educational reform to self-directed, collaborative or individualized learning in Asian countries. There are various models of collaborative learning, such as consensus group, peer tutoring, collaborative project work, writing peer reviews and consensual responses to lectures. Moreno (2005) views collaborative learning as an important learning model, in which students can benefit academically and socially when working together to achieve a common goal. In a recent paper, Ozmen and Atici (2014) consider the effects of learning management systems and social networking sites on the academic attainment of learners in a DL context.

Bender (2012) discusses some issues related to online group discussion, in which the role of the teacher in participating in group discussion with students is considered. Stone (2012) points out that the relationship between teachers and DL students is important — a positive relationship, which is difficult to establish, can lead to better student academic achievement. Yates, Brindley-Richards and Thistoll (2014) consider the issue of student engagement in DL courses, and conclude that providers should enable staff members to be student-centred in order to improve course completion rates.

### 2.3 IM communication in collaborative learning

As many IM tools are now available in the market, Yue (2014a) points out that supervisors are now made more 'available' (in terms of time) and

'friendly' (in terms of giving feedback) to students. In considering the impact of using text messaging on university teaching, Kovalik and Hosler (2010) found that students reacted positively to receiving text messages. The questionnaire used by Kovalik and Hosler in their study consists of 13 questions, which are studied by Yue (2014a) in the dissertation supervision context and in this paper.

Contreras-Castillo, Favela and Perez-Fragoso (2004) and Contreras-Castillo, Perez-Fragoso and Favela (2006) point out that instant messaging increases collaboration among course participants, reduces students' feeling of isolation and has a positive effect on learning. In a study of the impact of instant messaging on student participation, Hrastinski (2005, 2006) found that students who adopted instant messaging in a DL course had a higher level of participation than those who did not. Also, Shen et al. (2007) found that instant messaging can greatly support group collaboration by facilitating group work discussions. They point out that the notion of 'weintention' is the intention to participate in a group to perform acts in which the participants perceive themselves as members of the group. In a later paper, Shen et al. (2008) compared asynchronous learning technology tools, such as electronic mail and discussion forums, with synchronous ones, and concluded that instant messaging has some advantages that are especially suitable for task planning, scheduling, coordination and group discussion in educational settings. They further point out that instant messaging contains some unique features that can support students for online group project discussion.

# 3 Methodology

The target participants in this study were five groups of undergraduate students (with four students in each group), who were working separately on a live project in their final year of study. The degree programme was offered by a British university in co-operation with the School of Continuing and Professional Education (SCOPE) of City University of Hong Kong. The author was the project tutor of all five groups of marketing students over the period from February till May 2014. The project lasted for one semester of 15 weeks.

The performance of an individual student was assessed on three components: (1) a final group project report; (2) a group oral presentation; and (3) a peer assessment of the student by the other members in the project group. All members of a group received the same oral presentation and project report marks. Each group worked on a different marketing-related topic with an outside organization, and both the project tutor and the outside organization staff representative assessed the performance of the students on the above assessment components (1) and (2). For each student, the assessment component (3) was based on the peer assessment done by the other members of the group for that student.

During the whole project period, there were a limited number of face-to-face tutorial classes scheduled for students of all the project groups attending together. In addition, there was occasional electronic communication between the project tutor and students, using electronic mail and social media — WhatsApp and Facebook. Such communication included: (1) reminders of coming meeting details (such as the agenda, date, time and venue); (2) confirmation of work required from students for the coming meeting; (3) group announcements made by the project tutor; (4) feedback on queries arising from matters discussed or to be discussed; and (5) sharing of reference materials. For each student project group, a group facility was set up at both WhatsApp and Facebook. Participation in those groups was completely voluntary. The project work emphasized student-centred learning and team-working. Students were expected to make their own arrangements to meet regularly as groups, and also to meet with the outside organization's contact and with their project tutor.

A measuring instrument in the form of a questionnaire was developed. The questionnaire consisted of two major parts. The first part was the same as that used by Yue (2014a) relating to the IM tools and the views of respondents in using IM in teaching and learning (for statements AQ10–AQ21). The second part of the questionnaire consisted of statements (BQ8–BQ13) relating to the use of the Facebook group facility. The views of respondents on those statements were measured on a 5-point Likert scale (1 being 'strongly disagree' and 5 being 'strongly agree'). The students' feedback was collected through a paper-based questionnaire survey during the last tutorial class. The peer assessment and overall assessment results of

students were obtained from administrative records after the conclusion of the group projects. The possible relationship between these results and the students' final performance on those group projects was studied.

# 4 Results

# 4.1 Student usage of instant messaging

Based on the questionnaire data collected, all respondents indicated that they possessed a smartphone for their own use. Also, they all had used the WhatsApp IM tool in the past three months; and 45% and 50% indicated that they used WeChat and LINE respectively. As regards the usage of IM tools, half noted that they were heavy users for more than three years; 20% between two and three years; 25% between one and two years; and only 5% below one year. About 95% answered that WhatsApp was the IM tool used most often in the past three months.

Forty percent said that they spent more than three hours using IM each day, with the percentage spending less than one hour being 20%, 1–2 hours 5% and 2–3 hours 35%. Half of the respondents answered that they communicated with six to ten persons using IM tools each day. The percentage of respondents contacting less than five persons was 35%. Fifteen percent indicated that they contacted more than 15 persons using IM each day. Also, it was found that the persons the respondents usually contacted were: 'family members' (10%); 'friends' (100%); and 'classmates' (10%).

The reasons why IM was used more often than email were: 'quicker to use IM than email with my smartphone' (85%); 'can communicate with receiver simultaneously' (70%); and 'IM includes the functionality of email' (35%). The reasons that explained why respondents preferred to receive IM messages (those sent from the supervisor) rather than email or a web-based teaching platform were: 'quicker to receive IM messages than email or Blackboard announcements' (80%); 'More convenient to receive messages using smartphones' (85%); and 'IM tools provide alerts on receiving new messages' (35%).

#### 4.2 Use of group instant messaging

All respondents were aged 18 to 25; and six of the 20 respondents were male and the rest female. The average scores for questions AQ10–AQ21 for all 20 students were listed collectively and under different sexes, as summarized in Table 1. Most of the respondents agreed with the statements very positively, and the average score for most of the statements was far above the middle value of 3. The highest score corresponded to the statement that 'IM messages from the instructor are good to obtain course information', followed by 'IM is a good way to communicate with the instructor'.

Statements	Overall mean	Standard deviation	Mean (by sex)
AQ10: IM is a good way to communicate with the instructor.	4.10	1.21	3.17 (M) 4.50 (F)
AQ11: Receive useful information through messages	3.90	1.29	3.67 (M) 4.00 (F)
AQ12: Will follow up IM messages using computer if needed	4.00	1.17	2.83 (M) 4.50 (F)
AQ13: IM messages from the instructor are good to obtain course information.	4.15	1.09	3.33(M) 4.50 (F)
AQ14: Receiving IM messages from the instructor is normal to me.	4.05	1.03	3.50 (M) 4.31 (F)
AQ15: Frequently replied to the instructor on receiving IM messages	3.65	1.04	3.33 (M) 3.79 (F)
AQ16: Received the right number of IM messages from the instructor	3.85	1.14	3.33 (M) 4.07 (F)
AQ17: Initiated instant messages to the instructor at least once during 1–2 weeks	3.55	1.15	2.67 (M) 3.93 (F)

 Table 1
 Average scores for Questions AQ10–AQ21 grouped under sex (M=male, F=female)

			1
AQ18: Receiving IM messages from the	3.95	1.18	3.17 (M)
instructor helps me to stay up-to-			4.31 (F)
date with the course			
AQ19: Instant messages are useful in an	4.05	1.10	3.33 (M)
educational setting.			4.36 (F)
AQ20: Receiving instant messages is a	3.68	1.20	3.17 (M)
positive aspect of this course.			3.92 (F)
AQ21: IM is useful in the teaching and	3.94	1.06	3.67 (M)
learning process.			4.08 (F)

#### 4.3 Use of Facebook group messaging

Regarding the usage of Facebook group messaging, about 53% of the respondents indicated that they were heavy users for more than three years; 37% between two and three years; 5% for both between one and two years, as well as for below one year. Sixteen percent answered that they spent more than three hours using IM each day. The percentage of respondents spending less than one hour was 47%, 21% for 1–2 hours, and 16% for 2–3 hours.

About 42% said that less than five persons were involved in each online group, with 37% saying that 6–10 persons were involved in their online group, and 5% and 16% indicating that their online group involves 10–15 and more than 15 persons respectively. It was found that the persons that the respondents usually communicated with were: 'family members' (11%), 'friends' (68%), and 'classmates' (42%).

The reasons why the respondents used the online group facility were: 'can communicate with more than one group member conveniently' (58%); 'can share files/documents more conveniently than by instant messaging tools such as WhatsApp' (84%); and 'can share files/documents more conveniently than by email' (63%).

It can be seen from Table 2 that the mean scores for questions BQ8–BQ13 are high, with a value of around 4. The average score on BQ8 was higher than that of BQ9, indicating that students preferred to use the Facebook group facility among themselves than with the project tutor. There was a

clear difference between the male respondents' mean scores and those of the female respondents, with the male mean scores always being lower.

	Statements	Overall mean	Standard deviation	Mean (by sex)
BQ8:	Using the online group facility is a good way to communicate course information with group members.	4.16	1.17	3.50 (M) 4.46 (F)
BQ9:	Using the online group facility is a good way to communicate course information with the project supervisor.	3.89	1.15	3.67 (M) 4.00 (F)
BQ10:	I will usually use the online group facility with a desktop PC computer or notebook computer.	3.95	1.18	3.00 (M) 4.38 (F)
BQ11:	An online group facility can serve a useful purpose in an educational setting.	4.11	0.94	3.50 (M) 4.38 (F)
BQ12:	Use of an online group facility is a positive aspect of this project course.	4.00	1.00	3.33 (M) 4.31 (F)
BQ13:	I think that the online group facility is useful in the teaching and learning process.	3.95	1.03	3.33 (M) 4.23 (F)

 
 Table 2
 Average scores for Questions BQ8-BQ13 grouped by sex (M=male, F=female)

According to Table 3, some project groups (such as Groups A and E) showed a high level of interaction with the tutor using the WhatsApp IM tool and the Facebook group facility. It can be seen that Group A members had a very strong commitment to using such social media communication — they were very active in using both WhatsApp and Facebook during the project period. Group A initiated the highest number of WhatsApp with their project tutor, as well as Facebook group exchanges among the group

members. As introduced by some researchers (e.g. Shen *et al.*, 2007), the so-called 'we-intention' was strongest for Group A out of the five groups involved in the present study. The two social media group facilities were accepted for team collaboration when they were adopted by all Group A members. For Group E, the students were very active in using Facebook for sharing their work among themselves. Group B students did not take an active role in initiating Facebook messages during the project period — they used mostly WhatsApp to communicate with the project tutor, and used electronic mail instead of Facebook for sharing documents among the group members.

As can be seen from Table 3, all five groups of students completed their projects successfully with individual overall assessment marks well over 50. Group C had the highest average mark of 72.8, followed by Group D (70.6). An average number of WhatsApp messages were made between Group C and the project tutor throughout. The corresponding high standard deviation value of 2.98 indicated that group members rated the performance differently among themselves. Both Groups A and D had zero standard deviation for their members' marks since all members of these groups obtained the same overall assessment mark, which showed that the members of the respective group rated the other members equally in the peer assessment.

Project group	WhatsApp		Facebook			
	No. of incidents that tutor initiated messages to group	No. of incidents that group initiated messages to tutor	No. of incidents that tutor initiated messages or uploading documents	No. of incidents that group initiated messages or uploading documents among members	Overall assessment results (average of four students)	Standard deviation of marks for the four students in each group
А	25	21	12	121	64.2	0.00
В	24	5	13	0	63.9	2.11
С	31	17	19	54	72.8	2.98
D	42	11	26	21	70.6	0.00
E	32	12	27	81	58.8	2.21

 Table 3
 Statistics on using electronic communication and assessment results obtained for the five project groups of students
In the light of the findings on the questionnaire survey, discussions were held between the project tutor and some of the project teams. It was found that students in some groups had used WhatsApp to communicate among themselves outside the group mechanism. Students considered the communication between their project group and the tutor as a formal one. They, therefore, communicated with their tutor carefully because of his teacher status. Also, it was found that not all group members were active in using IM communication. The members of project groups had usually left the group representative(s) to take care of the WhatsApp communication with the project tutor.

#### 5 Conclusion

According to the responses obtained in the survey, the students were very positive about the use of social media communication during the project process. In fact, with social media communication, the project tutor can better monitor the progress of students, enabling the successful completion of the dissertation project. Social media communication is of great value to the assessment-as-learning mode of assessment of group project processes. However, the present study focused only on the communication between the tutor and students as a group. In the context of IM group communication, not all members of each group were active in using the group communication channel. For the Facebook group communication, most students only made use of the facility to share reference materials and their work with the other group members and the tutor.

In this paper, the student engagement in using WhatsApp and the Facebook group facility was measured on a project group basis, using the number of messages/postings initiated by the students. Other measures of engagement are needed so as to understand better the student use of the social media communication tools. Also, due to the limited number of students involved in this study, no control group of students (without involving both WhatsApp and Facebook group) was set up. Otherwise, a comparative study could have been carried out to check whether the completion of group projects was affected by such types of social media group communication.

The use of social media communication can strengthen the communication with, and facilitate better support of, students in addition to the regular face-to-face project meetings. Such communication can enhance the engagement of both students and the project tutor in the group project process. A closer and good relationship can be established between the two parties involved. Based on the results obtained, it can be concluded that social media group communication between the project tutor and the students had some positive impact. All five projects involved in the study were completed successfully. However, based on the present study, the possible direction of effect, as well as the relationship between the extent of communication (as measured by the number of messages exchanged) and the overall students' assessment results, is unknown. It is reasonable to assume that the overall assessment results of students depend on other factors as well. Potential factors might include, for example, the ability of individual students in a group, group members' commitment in completing the project, and social identity in the group. Further research can be pursued in this area.

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# Profiling MOOC platforms: Uniformity and diversity in course provision Kam Cheong Li, Billy T. M. Wong, Esther W. S. Chok

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Abstract: This paper presents an overview of the latest developments in massive open online course (MOOC) platforms. It profiles a broad range of representative MOOC platforms covering the major players, as well as the newly established ones, across different continental regions. The profile includes a total of 23 representative ones selected from 60 platforms, with their characteristics identified and categorized. The paper highlights the uniformities and diversities of MOOC provision, based on a number of dimensions, such as licensing, support for a mobile environment, course languages and accreditation. It reveals how various platforms exhibit features to position themselves for specific groups of target users. This profiling shows that (1) there is no clear relationship among the numbers of partners, courses and students; (2) almost all platforms only provide courses at the tertiary level; (3) open license is not commonly used for course materials; (4) mobile access is well supported by around one-third of the platforms; (5) platforms vary in their preferences for course languages; and (6) a number of platforms support course provision by users.

Based on these findings, the discussion focuses on (1) different forms of collaboration between MOOC platforms and institutional partners, showing a complementary, rather than competitive, relationship with each other; (2) the need to re-examine the interpretation of MOOC completion rates, in relation to the massive student base; (3) the limited openness of course materials; and (4) the high requirements for network infrastructure

and users' digital literacy for studying MOOCs, which may constrain their penetration.

Keywords: massive open online courses, MOOC platforms, open education

# 1 Introduction

In the few years since their emergence in 2008, massive open online courses (MOOCs) have become very popular. The provision of MOOCs through a MOOC platform enables an institution to reach a much higher number of students than by using a traditional mode of teaching. For example, the University of Pennsylvania had enrolled 2,300,000 students (Cook, 2014) by July 2014 through Coursera since the platform was launched in April 2012. In comparison, it had only around 25,000 on-campus students enrolled in the autumn of 2014.<sup>1</sup>

The rapid development of MOOCs has produced a potential paradigm shift in the delivery of education (Voss, 2013), which no education institutions, especially open education providers, can afford to ignore. It is widely agreed that academics and other relevant stakeholders have to keep themselves updated about the latest development of MOOCs (Harris, 2013; Li & Powell, 2013; Nanfito, 2013).

Existing studies of MOOCs, however, have focused mainly on a few major platforms and dimensions. For example, Li and Powell (2013) compared the features of only five platforms (Coursera, edX, Udacity, Udemy and P2PU) in four dimensions (for profit, free to access, certification fee and institutional credits). Also, the studies of MOOCs tend to be introductory in nature. Liyanagunawardena, Adams and Williams (2013a) surveyed the MOOC-related papers published in 2008–2012 and found that, in this period of MOOC development, most papers focused on introducing MOOC and discussing its challenges and trends in general.

While attention has been paid mainly to the high-profile MOOC platforms, other platforms have been launched in recent years, which have unique

<sup>1</sup> http://www.upenn.edu/about/facts.php

features. For example, Tsinghua University in mainland China launched a Chinese MOOC platform (xuetangX.com) in October 2013 which utilizes the edX's open source platform and now provides more than 150 courses. The lack of relevant systematic studies to cover the MOOC platforms worldwide constrains our understanding of the MOOC phenomenon.

This paper profiles the representative MOOC platforms in order to provide an overview of the latest developments in MOOCs. It selects a representative sample from a large number of platforms available and categorizes their characteristics, based on which some common and unique features of MOOC platforms are identified. The discussion highlights notable areas of MOOC development, such as the use of open educational resources (OER) and support for mobile learning.

# 2 Methodology

This study aims to (1) collect information on MOOC platforms being actively operated; (2) classify the platforms into groups; and (3) identify their characteristics.

Information on MOOC platforms was collected from several sources. The website *MOOC List*<sup>2</sup> was accessed to generate a list of platforms in North America, Europe and Australia. As the *MOOC List* did not give a sufficient coverage of the platforms in Asia, two other supplementary sources — the website *taiwanmooc.org* and a white paper produced by China Education Network (2013) — were consulted for the Asian platforms. This resulted in a total of 60 MOOC platforms. Section 3.1 illustrates the development of these platforms in terms of their launch year and continental regions.

The 60 platforms were further examined to identify the representative ones for profiling. There were two criteria for inclusion: (1) platforms that offered over 100 courses, representing the large-scale ones; or (2) platforms that were representative of their kind or widely recognized in their regions. This resulted in a total of 23 platforms, which are categorized in Table 1 according to their continental regions.

<sup>2</sup> http://www.mooc-list.com/

Asia

• Schoo

• xuetangX.com

#### Table 1 MOOC platforms selected for profiling

#### Group A (offering over 100 courses)

- *Europe* • ALISON
- Coursera
- Miríada

• OpenupEd

- edX
- Miríada X
- Khan Academy
- P2PU
- Tareasplus Australia
- Udemy Open2Study

#### Group B (offering fewer than 100 courses)

North America	Europe	Asia
• Canvas.net	• FutureLearn	• ewant
<ul> <li>Mongo DB</li> </ul>		• icourse163.org
• NovoEd	Australia	• JMOOC
<ul> <li>Udacity</li> </ul>	<ul> <li>OpenLearning</li> </ul>	Shanghai Course Centre
		ShareCourse

The profiling was conducted in June–August 2014. The following data for each platform were collected from their websites:

- Partnerships
- Number of courses
- Number of users
- Course level

- Accreditation (certification, college credits and the conferral of degree)
- Licensing
- Mobile operation system
- Course languages and categories

The characteristics of the 23 platforms selected for profiling are categorized into general information (Section 3.2) and operation (Section 3.3) using a table format according to the above dimensions. Since different platforms vary in terms of their transparency, the profiling includes a platform in the tables only when the accessible information is sufficient to fill up more than half of the columns of the tables.

# 3 Results

#### 3.1 Launch year and continental regions

Figure 1 illustrates the launch years and continental regions of the 60 platforms examined.<sup>3</sup> More than half of the platforms (39 out of 53) were launched in 2012 and 2013. Several platforms were established in or before 2010, which may have operated as online learning platforms at the very beginning and later changed their role to MOOC providers. Hence, the launch year only refers to the year the platforms started operating, without implying that they were MOOC platforms from that time. For example, Khan Academy was launched in 2006, prior to the emergence of the first MOOC in 2008, but it was later widely categorized as a MOOC platform (Akanegbu, 2013; Li & Powell, 2013; The Chronicle, 2014).

In terms of continental region, nearly half of the MOOC platforms are located in North America. In Asia, there are also a number of platforms, most of which were launched in 2013. Putting together the launch year and the base of the platforms, it is observable that the trend of MOOC began in North America, and soon spread to Europe, Australia and Asia.



Figure 1 The development of MOOC platforms

3 Only 53 platforms (out of 60) provide information on their launch year.

#### 3.2 General information

Table 2 shows general information on the 23 platforms profiled. There appears to be no direct relationship among the numbers of partners, courses and users. Coursera, edX and ALISON, which are in partnerships with many leading universities, organizations or publishers, have accumulated a great number of users. Coursera, as the 'most massive' platform, has been collaborating with 111 universities over the world, providing 750 courses, with over 9 million users.<sup>4</sup> There are also platforms providing a vast number of partners, such as Khan Academy, Udemy and Udacity.

In terms of course level, except for Khan Academy, all the platforms solely provide courses at the tertiary level or for vocational development.

Licensing is another issue worthy of attention. Most of the platforms adopt full copyright to protect their course materials. Only three (Khan Academy, P2PU and Udacity) adopt the Creative Commons license, and one (OpenupEd) uses this license partially by advising its course providers to adopt this form of licensing but not restricting them to doing so.

About one-third of the platforms provide their own application software for different mobile operating systems. The others either explicitly specify that such a feature is currently not available or do not provide relevant information on their site, though this does not necessarily mean that the platforms are inaccessible in the mobile environment.

<sup>4</sup> https://www.coursera.org, as of 31 August 2014.

	No. 0	f pa	rtne	rs	No	. of	cou	rses		N	0. 0	f use	ers		Co	urse	level	Lice	nsing	Mo	bile	OS
Platform	<20	20-40	41–60	>60	<50	51-100	101-500	>500	>10 thousand	>50 thousand	>100 thousand	>500 thousand	>1 million	>5 million	Primary or below	Secondary	Tertiary <sup>[2]</sup>	All rights reserved	Creative Commons	Android	iOS	Not supported
Group A (above 1	00 cour	rses)																				
Khan Academy	~					-	~							~	~	~			CC BY- NC- SA 3.0		~	
Coursera				✓				√	1					√	1		√	1		1	√	
edX			√	1			√		1				√		1		√	*				✓
Udemy	√		1	Ť				✓	1			İ	✓	1	1	İ	√	1		1	√	
P2PU	<b>√</b> <sup>[1]</sup>						~			<u>.</u>	n	/a	<u>.</u>	••••••			~		CC BY- SA 3.0			~
TareasPlus	✓ <sup>[1]</sup>		Ì	-			✓	1	1	•••••	n	/a	•••••		+		√	✓		1	√	
ALISON			1	✓				✓	•••••	-	Ī	Ī	✓	Ī			√	1	-			√
Miríada X		√					√		<b> </b>		n	/a	. <u>.</u>	. <u>.</u>	+		√	✓	-		n/a	••••••
OpenupEd	√		+				√	1	<u> </u>	••••••	n	/a	•••••		†		√		* <sup>[3]</sup>		n/a	•••••
Open2Study		√	1	İ		√		İ	1		✓	Ī	-	T	1	İ	√	1				✓
Schoo	√						√		<ul> <li>✓</li> </ul>								√	1		1	√	
xuetangX.com	√						√	-	<ul> <li>✓</li> </ul>			-		-	1		√	n	/a		n/a	•••••
Group B (below 1	00 cour	rses)																,				
Udacity	~				~								~				~		CC BY- NC- ND 3.0		~	
Canvas.net		√			1								✓				√	✓		✓	√	
MongoDB	✓				1				1								√	~				✓
NovoEd	✓				1						n	/a					√	~			n/a	
FutureLearn		√			1						✓						✓	$\checkmark$				✓
OpenLearning		√				√					n	/a					√	1		1	√	
Shanghai Course Centre		1				✓					✓						✓	~			n/a	
ewant	✓		<u>.</u>	<u> </u>	1			<u>.</u>	ļ	√		<u> </u>	<u>.</u>	<u> </u>	ļ		✓	1			n/a	
ShareCourse		✓	ļ	<u>.</u>	1			ļ	ļ		n	/a			ļ	ļ	✓	1			n/a	
icourse163.org	✓		<u>.</u>	ļ		√		ļ	ļ	. <b>.</b>	n	/a	<i></i>	. <b>.</b>	ļ	ļ	✓	✓			n/a	
JMOOC	✓				$\checkmark$				$\checkmark$								√	n	/a		n/a	

#### Table 2 General information on MOOC platforms

<sup>[1]</sup> There is no evidence that this platform is engaging in any partnership.

<sup>[2]</sup> The term 'tertiary level' means that course contents are either at the university level or focusing on vocational developments.

<sup>[3]</sup> The types of licensing are decided by course providers and hence may differ from course to course.

✓ = Applicable; \*= Partially applicable; n/a = Information not provided

#### 3.3 Operation

Table 3 provides information related to the operation of the platforms. It is expected that the course languages and course categories of a platform, to a certain extent, represent its specific group of target users. For course languages, the platforms with the greatest number of users (i.e. Coursera, edX, Khan Academy, Udacity, Udemy and ALISON) offer courses in a variety of languages, such as English, Spanish and Chinese. It is thus reasonable to infer that these platforms are targeting users worldwide. OpenupEd, as a pan-European initiative, provides courses in European languages, such as English, Spanish, French, Irish, Italian and Russian; while the platforms in mainland China (e.g. icourse163.org) and Taiwan (e.g. ewant) mostly have Chinese as their medium of instruction, suggesting their different groups of target users.

In terms of course categories, most platforms provide courses in the disciplines of arts, science and social science. Two platforms (Udacity and MongoDB) do not have courses in arts and social science, focusing only on the field of science.

A number of platforms (viz. Udemy, P2PU, Tareasplus and OpenLearning) allow users to create and provide courses. This can be a potential source of revenue for the platforms, but runs the risk of compromising the quality of the courses provided. As a matter of fact, upon a closer examination of the user-created courses, we observed that most of them, other than providing course materials such as video lectures and written content, have little interaction between the course creators and the learners.

The ways of accreditation reflect the strategies the platforms employ to attract learners. Most of the platforms issue certificates for students who meet the course requirements, but only a few offer institutional credits by collaborating with other universities/colleges or through the use of a specific credit transfer system (e.g. the European Credit Transfer System). To date, only Udacity has attempted to grant a Master's degree in Computer Science by partnering with Georgia Tech University to offer the online programme.

		C	ourse l	angua	ges		Cours	e cate	gories	Ac	tion		
Platform	Chinese	English	Spanish	Portuguese	Japanese	Others	Arts	Social science	Science	Certification	Institutional credits	Institutional degree	Anyone can set up a course
Group A (above 100 co	urses)												
Khan Academy	~	~	✓	~		~	✓	~	✓				
Coursera	√	✓	✓	√	√	✓	✓	√	✓	√	*	•••••	
edX	√	√	✓			✓	✓	✓	✓	√		•••••	
Udemy	√	√	✓	√	√	✓	✓	✓	✓	√		•••••	√
P2PU	√	✓	✓	√		✓	✓	✓	✓			•••••	√
Tareasplus			✓	√			✓	✓	✓	√		n/a	√
ALISON	√	✓	✓	√		✓	✓	✓	✓	√		•••••	
OpenupEd		√	✓	√		✓	✓	✓	✓	√	✓	n/a	
Open2Study		✓					✓	✓	✓	√			
xuetangX.com	√	✓					✓	√	✓	√			
Group B (below 100 co	urses)												
Udacity	~	~	~	~		✓			~	✓	*	~	
MongoDB		✓							✓	√			
NovoEd		√	✓				✓	✓	✓	*			
FutureLearn		✓					✓	✓	✓	√			
OpenLearning		√					✓	✓	✓	*		•••••	✓
Shanghai Course Centre	√						√	✓	✓	√	✓	n/a	
ewant	√						✓	✓	✓	√			
icourse163.org	√						✓	√	✓	√			
JMOOC		√			√		✓	√	✓	√	n/a	n/a	

Table 3 Operation of MOOC platforms

Note: ✓ = Applicable; \*= Partially applicable; n/a = Information not provided.

#### 4 Discussion

The profiling has uncovered some common and unique features of the representative MOOC platforms. Based on these features, there are a number of issues worth noting.

There is a close collaborative relationship between a platform and its partners. All platforms in our profiling collaborate with institutions, organizations or companies for providing courses. Some platforms were established and strongly supported by traditional institutions. For example, edX was founded by Massachusetts Institute of Technology and Harvard University, and is now partnering with around 54 academic institutions, corporations and organizations for offering courses.<sup>5</sup> Several platforms further grant credits recognized by their collaborating institutions to students who have completed the courses. Shanghai Course Centre in mainland China, as a representative example, serves only the students of its collaborating institutions. The students gain credits for taking the courses provided on the platform, which are recognized by the institutions they belong to and the institutions that offer the courses. The current operational mode of MOOC platforms thus serves as a complement to, rather than a competitor of, the tradition mode of education. This is consistent with the observation that more and more institutions are experimenting with the integration between MOOCs and traditional education (Sandeen, 2013).

The massive scale of MOOCs in terms of the number of students raises a need to review the interpretation of MOOC completion rates. Our profiling reveals that the platforms already have a very substantial number of registered users, ranging from 10,000 to over five million. However, the seemingly low completion rates of their courses — below 10% on average (Jordan, 2014; Kolowich, 2013; Parr, 2013) - are often regarded as a problem (ELI, 2013; Fischer, 2014), especially considering the huge investment in developing a MOOC. Kolowich (2013) reported a MOOC survey that shows the median number of enrolments per course is 33,000, and that of completion with a passing grade is 2,600. Despite the completion rate (7.8%), the number of students who complete a course is considerable for a face-to-face institution. Fischer (2014) further points out that, from another perspective, the apparently low completion rate can be explained by the ease of enrolment (which requires usually only a few mouse clicks and no cost). The meaning of completion rate for MOOCs, in this sense, needs to be re-examined.

Many platforms provide application software tools to access their courses on mobile operation systems. Some preliminary figures show that mobile usage accounts for 20% or above of MOOC consumption (Hara, Moskal &

<sup>5</sup> https://www.edx.org/schools-partners, as of 31 August 2014.

Saarinen, 2013; Hepler, 2014). Nevertheless, access to MOOCs in a mobile environment requires a well-established technology infrastructure such as wide network coverage and high bandwidth. Yuan and Powell (2013) also comment that high digital literacy is needed in order to master the MOOC learning environment, which involves the use of different digital devices, operation systems and MOOC platforms. These prerequisites for studying MOOCs become barriers for those living in less developed regions and who are not technologically ready. As shown in recent studies, most MOOC students come from the developed countries (Liyanagunawardena *et al.*, 2013a) and are well-educated (Emanuel, 2013).

The fact that only a few platforms adopt open licenses for their course materials is another barrier for MOOCs to penetrate into the developing regions. This is, to a certain extent, a contrast to the view that MOOC is derived from the development of open educational resources which feature the use of open licenses (Yuan & Powell, 2013). For most platforms, the course materials are openly accessible but under strict copyright terms, and are not allowed to be copied, translated or reused (in original or revised form). This means that education providers are not allowed to translate and localize the course materials into the local language and culture of a developing region, nor disseminate the materials in a form (e.g. printed version) other than their original online version which is technologically demanding for students to access (Liyanagunawardena, Williams, & Adams, 2013b).

#### 5 Conclusion

This paper has examined a large number of MOOC platforms, presenting their different characteristics in course provision. It reveals the overall MOOC development which has not been shown clearly in previous studies focusing on only a few major platforms. This study thus supplements the previous ones by covering more representative platforms and kinds of features.

Although it has been suggested that the development of MOOCs reached its peak in 2013 and began to slide into a trough in 2014 (*Lowendahl*, 2013, 2014), our profiling has shown that new MOOC platforms kept evolving

in 2014. Some of them have unique features in areas such as course language and accreditation. From this perspective, this study shows that the development of MOOCs may begin to focus on market segmentation for serving specific groups of target users. This is apparent for regional platforms recently launched which provide courses in languages other than English.

As informed by this profiling, MOOC has raised a number of issues which await exploration. The proper ways of collaboration between a platform and its partners, and the interpretation of course completion rate, are two examples which are significant for determining the effectiveness of MOOC provision and its future direction.

MOOC has created a vision that it may bring affordable and accessible education to the neediest parts of the world (Bartholet, 2013; Boga & McGreal, 2014). This vision has been realized to a limited extent so far, because of barriers such as technological requirements and copyright restrictions on course materials. There is a need to review the extent to which the current provision of MOOCs has achieved its objectives and how it could be improved for a greater impact.

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# 12 The CSIDS project: Building a shared eBook collection through collaborative purchase

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Abstract: The Open University of Hong Kong, together with four other self-financing institutes in Hong Kong, received a grant of HK\$50M for a three-year project from 2014 to 2016. One of the goals of the project is to enhance the library collection to promote a better teaching and learning environment at the five institutes. This paper reports on the joint effort in preparing and implementing the eBook collaborative purchase. The project aims to acquire a collection of 15,000 to 25,000 eBooks for shared and perpetual access by the students and academic staff of the member institutes. The purchase has been confined to eBooks to facilitate resourcesharing and support on-campus and off-campus courses, including distance learning programmes. The major tasks in the implementation include: deciding on collection development policies and strategies; liaising with vendors and price negotiation; and eBook selection and purchase. The paper begins with the preparation work before the project started, and reports on the progress and achievements of the eBook collection development in 2014. It describes the practices that have been adopted to promote collaborative acquisition and collection-building, and discusses issues and expectations related to the eBook collaborative efforts within and beyond the project period.

**Keywords:** distance learning, electronic books, collection development, collaborative purchase, library collaboration, consortium

#### 1 Introduction

In early 2013, the Open University of Hong Kong (OUHK), Hong Kong Shue Yan University (HKSYU), Caritas Institute of Higher Education (CIHE), Chu Hai College of Higher Education (CHCHE) and Tung Wah College (TWC) jointly submitted a proposal to the Education Bureau (EDB), applying for Self-financing Post-secondary Education Fund (SPEF) (Committee on Self-financing Post-secondary Education, n.d.-a) under the Quality Enhancement Support Scheme (QESS)<sup>1</sup> (Committee on Selffinancing Post-secondary Education, n.d.-b). The QESS was part of the SPEF to promote and enhance the quality of teaching and learning for students and teachers in the non-profit making educational institutions offering full-time locally accredited self-financing sub-degree or bachelor's degree (including top-up degrees) programmes. There are two types of applications for each academic year, namely theme-based and open-ended projects. In the theme-based type of application, it is hoped that the funding will foster collaboration among different institutions for cost-effectiveness and to benefit the sector as widely as possible. The themes set for the 2012-2013 round of joint institutional applications were for: (1) platforms for the sharing of resources; (2) platforms for improving teaching and learning, enhancing student support and career guidance services; and (3) projects to prepare students for further study or employment.

The OUHK, together with four other self-financing institutes, submitted a theme-based project on the E-library in February 2013. The project title is 'Collection sharing and an information discovery system with enriched digital content' (The Open University of Hong Kong, 2013a). It aims to: (1) build a system embedded with next generation search and discovery tools to enable collection-sharing and information discovery for the learning community; and (2) enrich the current library collections by establishing a shared eBook collection through collaborative purchase among the five self-financing institutes (http://www.csids.edu.hk/). This paper is a report

<sup>1</sup> In the 2010–11 Policy Address, the Chief Executive of the HKSAR government announced the establishment of a \$2.5 billion Self-financing Post-secondary Education Fund (SPEF) to support worthwhile initiatives that aim to enhance the quality of self-financing post-secondary education. The Quality Enhancement Support Scheme is one of the schemes supported by the investment returns of the SPEF.

that focuses on the joint efforts in building up the eBook collection for shared and perpetual access among the member institutes during the first year of the project in 2014.

#### 2 EBooks and distance learning

Fuegen (2012), after reviewing the existing literature, states that 'flexibility, portability and accessibility contribute to an overall positive impression on students' and that students look for 'immediate support' in a distance education (DE) environment. DE students usually have full-time employment and expect flexibility and convenience to access contents for their learning and studies (ibid. pp. 49, 51). EBooks have been identified as a teaching and learning tool for academic purposes as they offer particular advantages to DE students. Nicholas and White (2012) report that a study carried out in 2005 at the Indian Institute of Science indicated that 63.33% of the students surveyed were impressed by the instant access to eBook contents. Also, off-campus students at the Central Michigan University (CMU) asked for more access to eBooks in 2007; and a subsequent survey at the CMU of the usage statistics for a three-year period found that, when eBooks were chosen specifically to support instruction off-campus, those particular books were used frequently by off-campus students - and that more eBooks were needed for off-campus instruction. The loans of print books to off-campus students decreased by 73% from 1997-1998 to 2006-2007 at the CMU. These survey results suggested that supplying books to distance learners could be achieved in a timely and cost-effective way through a comprehensive eBook collection (Grudzien & Casey, 2008).

The Royal Roads University in Canada has focused on 'distributed learning', where 80% of the students and quite a number of the academic staff work at a distance. Most of the programmes were taught through distance learning (DL) and had a limited on-campus residency of two or three weeks, two or three times during the programme of study. In both the 2003 and 2009 eBook use surveys, about 54% of the respondents said that they did not prefer a print version of the books over the eBook version. There was also a notable increase in the use of eBooks for course readings from 2003 to 2009. In the 2009 survey, 86.9% of the respondents

indicated that they used the library's eBooks for their research assignments (Croft & Davis, 2010). Also, in November 2011, DL students at the Pepperdine University were surveyed about the types of eBooks and their features, and their awareness of the products — and 47% expressed the view that the topics or purpose of the books were significant in terms of usage; and 85% of the respondents used electronic books for academic, research or school purposes (Brahme & Gabriel, 2012).

Nicholas *et al.* (2012) point out that the distribution of eBook contents via the Internet has provided the possibility of 24/7 access to the learning materials from anywhere, which is appealing to distance learners. It has also provided equality of access to both on-campus and off-campus users, as well as distance learners. Searching and linking across texts has allowed books to be linked to other books and websites. Serban and Calina (2013) argue that the prevalence of electronic publications over print is due not only to delivery time but also mainly to the major advantage of being easily found and transmitted, which has enabled great access to science and culture.

#### **3** Preparing for the CSIDS project

The mission of the OUHK Library is to provide a quality information service and a convenient environment for information access to both students and staff, with a view to supporting the University's learning, teaching and research activities. In 2014, the Library has a collection of nearly 180,000 printed and multimedia items. The Electronic Library provides access to more than 34,000 electronic journals and databases, 43,000 electronic books, as well as electronic news, reference resources, past examination papers and supplementary readings. The Library users can access the electronic collections anytime and anywhere while they are on the campus, at home or in the office (http://www.lib.ouhk.edu.hk).<sup>2</sup> To

<sup>2</sup> The OUHK Electronic Library project was sponsored by the Croucher Foundation, the Hong Kong Jockey Club Charities Trust and the Hong Kong Government. The Electronic Library serves as an information gateway which can be accessed anytime anywhere from a device with Internet connectivity. The project was completed in 2000 and won the Stockholm Challenge Award conferred by the European Commission and the City of Stockholm in the same year.

facilitate access for distance learners, the OUHK Library has been acquiring electronic copies of library materials as far as possible. Print copies are purchased only when the recommended book is not available in e-format. Although the majority of the book collection is offered in the traditional print format, more and more publishers have made their book titles available in digital format. It has been estimated that, in 2017, 47.12% of the total sales of professional and scholarly books will be in digital format, a rise from 27.52% in 2012 (Daubman, Artiles, Lynch & Greco, 2014).

EBooks improve access to book contents, and they are also a suitable tool for supporting various teaching and learning modes for face-to-face, e-learning or DL programmes. The CSIDS project proposes building up a collection of 15,000 to 25,000 eBooks for shared and perpetual access for the students and academic staff of the five institutes, thus enhancing the library collection and promoting a better teaching and learning environment. When preparing the project proposal, eBook vendors were approached during the 'Request for Information' (RFI) stage for suitable eBooks for the project. From their feedback to the RFI and the followup communication between the vendors and the member librarians, the price, potential discount and the annual publication output of the eBooks of some vendors were collected and estimated for preparing the project proposal and budgets. Presentations by eBook vendors were arranged after the RFI period, and member librarians shared the workload of the project planning and vendor liaison on the clarification of terms and conditions for eBook purchases and pricing.

In June 2013, the EDB informed the OUHK of its support for the joint project proposal, with a grant of HK\$50M, covering the costs of equipment and services for the library integrated and discovery systems, general expenses, digital content and a portion of the requested staffing expenses. After consulting the member libraries' senior management on the staffing and financial arrangements, all five institutes confirmed their participation. A written agreement specifying the contractual obligations and responsibilities of each party was signed by all participating institutions in September 2013 (The Open University of Hong Kong, 2013b). The agreement included the role and contribution of each participating institution; a decision-making and dispute settlement

mechanism; financial commitments and use of the grant, and termination procedures and consequences. The Central Project Team (CPT) was established for the administration and management of the project and started meeting on a monthly basis from September 2013. The CPT, chaired by the OUHK's Librarian, is composed of the Librarians of the five participating institutions, as well as representatives of the Library and Information Technology Units of the member institutes. With regard to eBook purchases, the CPT is responsible for confirming the collection development policies for the collaborative purchases, monitoring the project's progress against the planned schedule and agreed strategy, and developing solutions for handling irregularities identified. The CPT also has an overseeing and decision-making role in the project implementation and is responsible for formulating the direction for collection development and management of the shared eBook collection. A separate eBook project team, consisting of two Assistant Librarians and six Library Assistants and responsible for the daily administration and operation of eBook purchase and collection-building, was established at the OUHK in late 2013. The team started their work in January 2014. The OUHK was also responsible for training and supervising the project staff to coordinate purchases for the project, in accordance with the University's procurement policies and procedures and in compliance with the QESS Guidelines on Application and Management of Projects (Education Bureau, 2014).

#### 4 Progress and practices

The *Collection Development Policies* were confirmed in October 2013; they served as the guiding principles for the collaborative purchase of an eBook collection with the project funding. In the policies, members agreed that (1) the purchase should be confined to eBooks for project sustainability and to facilitate sharing; (2) the purchase of eBooks for perpetual access with no on-going maintenance fee would be given priority; (3) eBooks for perpetual access with nominal ongoing fees would be considered for purchase only when all member libraries agreed to share the on-going fee; and (4) eBooks on a subscription basis or with a large annual fee would not be purchased in this project. A list of eBook requirements and a template for quotations were agreed in December 2013 for eBook vendors to prepare proposals

for the project. All eBook vendors or publishers were welcome to submit proposals and the CPT will continue to review and evaluate the vendors' proposals throughout the three-year project period as long as funding for the joint eBook purchase is still available.

In March 2014, the Collection Development Guidelines (E-book collection development guidelines for the collection sharing and information discovery system (CSIDS) with enriched digital content, CSIDS, March 2014) were also confirmed, which contain details of responsibilities, selection criteria, tools and the schedule for the collection development tasks (The Open University of Hong Kong, 2014a). All five participating libraries are responsible for selecting materials carefully to build up the shared eBook collection to support academic programmes and research activities at their institutions. The materials should be selected based on the recommendations from the academics or from authoritative reviews and bibliographic tools. The eBook Project Team is responsible for providing the necessary administrative and clerical support to the member libraries to facilitate their selection of eBook materials, to process the actual orders, and to assist in budget monitoring and control. The OUHK is responsible for overseeing and monitoring the implementation of the collection development guidelines, and for ensuring that the quality of the support to the member libraries is up to standard.

The liaison and price negotiation with eBook vendors have been shared among the libraries of the participating institutes. From October 2013 to December 2014, a total of 32 eBook vendors were contacted, and the terms of trade for collaborative purchase were actively negotiated. The CPT accepted 13 proposals and signed license agreements with 11 eBook vendors during the period. Among those, one license was for joining a consortium with nine other Hong Kong or Macau academic institutions for shared and perpetual access to the eBook titles selected by all 14 members in the consortium. The major tasks during the preparation and implementation stages of the collaborative purchase are listed in Table 1. (See Progress Report of CSIDS, July 2014, (Project No.: T01/QESS/2013), Quality Enhancement Support Scheme, prepared by the Open University of Hong Kong (2014b).) There were 18 broad subject areas identified to be related to teaching, learning and research at the participating institutes. To develop a collection of titles for each subject area, the eBook Project Team has been working with member libraries to develop the classification number ranges, search keywords and strategies for locating appropriate publications. In 2014, the eBook Project Team has set up subject profiles with member libraries for those disciplines related to Business and Economics, Education, Language and Literature, Medicine and Nursing, Science and Technology, Fine Arts and Philosophy and Psychology, etc. (see Table 2). According to the agreed search terms and subject disciplines, the eBook Project Team has been sending monthly title lists to member libraries for selection. The title list for each subject area has included book titles from the publication year 2012 to the current year. Members agreed that current materials should be given higher priority in the selection of eBook titles for shared access. Older materials may be selected as necessary, depending on the requirements of the courses.

 Table 1
 Major tasks for the collaborative purchase during the preparation and implementation stages



Members have submitted their monthly recommendations since the project was launched in January 2014. The book titles might come from the monthly list prepared by the Project Team or from the recommendations received at their institutes. Excluding duplicates and unfulfilled orders, a total of 10,154 titles have been confirmed with vendors through the CSIDS project (see Table 3). The number of eBook titles acquired for shared and perpetual access should reach 11,071 if titles selected by the other members of the Hong Kong/Macau consortium are included as well. The majority of these titles are related to Social Sciences (including Business and Economics), Language and Literature, and Medicine and Nursing (see Table 4).

#### 5 Issues and expectations

#### 5.1 Cost-effectiveness

There are various reasons for purchasing collaboratively. In a survey of the Taiwan '2007 Chinese E-books Consortium', Huarng and Wang (2009) reported feedback collected from 40 universities and colleges, where all participants agreed that they could obtain better discounts and could share in the rich collections. Libraries have been purchasing digital resources co-operatively since the late 1990s 'to create leverage with vendors and publishers to get concessions for library interests and to develop shared licenses with better terms and provisions for the group' (Machovec, 2013, p. 200). It has also been one of the objectives of the members of the CSIDS project to arrange for collaborative purchases so as to maximize the costeffectiveness. Unlike print book titles, where there is always a listed price for reference, eBook prices vary from one vendor to another. While some may charge the same price as the print equivalent, others may charge at a multiple of the print price even for an individual library purchase. It has been difficult to express the savings or effectiveness for group purchase of eBook materials.

Subject Disciplines (Library of Congress Classification Outline)	OUHK	CIHE	CHCHE	HKSYU	TWC
General works	Yes	Yes	Yes	Yes	Yes
Philosophy, Psychology, Religion*	Yes	Yes	Yes	Yes	Yes
Auxiliary Science of History	Yes		Yes	Yes	
History, general and old world*	Yes		Yes	Yes	
American History				Yes	
Geography*	Yes		Yes	Yes	
Social Sciences**	Yes	Yes	Yes	Yes	Yes
Political Science*	Yes		Yes	Yes	
Law*	Yes	Yes	Yes	Yes	
Education*	Yes	Yes	Yes	Yes	Yes
Fine Arts*	Yes	Yes	Yes		
Language and Literature*	Yes	Yes	Yes	Yes	Yes
Science*	Yes		Yes	Yes	Yes
Medicine*	Yes	Yes			Yes
Technology*	Yes	Yes	Yes	Yes	Yes
Military History				Yes	
Bibliography, Library Science and Information Sciences			Yes		

 Table 2
 Subject disciplines related to the study strands at member institutes

\* Subject profiles developed in 2014

\*\* Subject profiles of the Business and Economics discipline were developed

January 2014 – December 2014	English	Chinese	Total
No. of titles sent to members for selection	26,019	5,157	31,176
(since Feb 2014)			
No. of recommendations submitted by	28,515	7,191	35,706
members			
No. of titles sent to vendors for orders*	8,034	2,636	10,670
No. of titles unfulfilled or cancelled	432	84	516

 Table 3
 Recommendations and orders for collaborative purchase (2014)

\* To be cautious with budget control, only titles below HK\$2,000 or HK\$2,200 for shared access were purchased from January 2014 to November 2014 and in December 2014 respectively.

Subject	Chinese	English	English*	Total	%
Social Sciences	450	1922	207	2579	23%
Language and Literature	877	1263	172	2312	21%
Medicine	206	1408	60	1674	15%
Science	94	547	150	791	7%
Philosophy, Psychology,	226	467	20	713	6%
Religion					
Technology	98	392	70	560	5%
World History	190	237	22	449	4%
Law	92	277	19	388	4%
Fine Arts	54	210	52	316	3%
Geography,	54	215	34	303	3%
Anthropology					
Political Science	54	186	57	297	3%
Education	59	208	27	294	3%
Others	98	270	27	395	4%
Total	2552	7602	917	11071	100%

 Table 4
 Number of titles acquired for shared and perpetual access (2014)

\* Some English titles are available for shared and perpetual access through the titles selected by the other nine members of the Hong Kong/Macau consortium.



Figure 1 Subject distribution of the eBooks acquired (2014)

#### 5.2 Pricing models

To assist in the evaluation of eBook vendor proposals, the CSIDS eBook Project Team has tried to work out a multiplier to compare the cost of individual library purchase and the joint purchase. Sample titles have been selected from each batch of price quotations to compare the print price against the eBook price for individual libraries, as well as the eBook price for shared access among the five members. It is expected that, by the end of the project, more data can be collected to assist in the development of policies and strategies for future collaborative eBook purchases and, ideally, some pricing models could be worked out and agreed with the eBook vendors for the continuation of group purchase among the existing members after the completion of the project.

#### 5.3 New members

The CSIDS project also aims to facilitate the entry of new institutions other than the existing participating institutions. Members have discussed and specified the entry requirements for new participating institutions to join CSIDS and the e-Library system at a later stage. However, whether shared and perpetual access to eBooks is available for a group of members relies very much on the pricing policies of the individual publishers or vendors. It is inevitable that, for new members to join future purchase or to share the already acquired eBook titles, the CSIDS project members will need to explore with the vendors the pricing schemes and to negotiate the terms for each individual eBook license.

#### 5.4 Purchase scope

The current project has targeted to build up an eBook collection for shared access. In future, the need for library materials may continue to evolve according to the development and priorities of the individual institutes and of the publishing industries. In addition to databases and electronic journals, publishers are also providing audiovisual materials, dissertations, and standard materials in electronic format. Members may want to extend the types of materials to be collected or acquired through group purchase for access to a wider range of materials. Machovec (2013) points out that, in a collaborative environment, members will have to compromise on the different preferred solutions and contractual cycles. To best optimize their resource allocation and to provide the best services that are relevant to their own institutes, libraries will need to work out their collection development priorities.

#### 6 Conclusion

With the HKSAR government funding under the QESS for Self-financing Post-secondary Education, and the staffing support from the participating institutes, the libraries of the OUHK, HKSYU, CIHE, CHCHE and TWC have been aggregating their purchasing power to negotiate with eBook vendors for shared and perpetual access at better pricing or licensing terms. Member librarians have shared the workload in the collection building and license negotiation. The initial joint efforts in collective purchases have already complemented each other's library collections. A rapid increase in the size and breadth of the eBook collections at member institutes is anticipated. The enhancement of the library collections through the sharing of the resources will surely improve the experience of the staff and students at member institutes in their access to and search for materials relevant to their studies and research on-campus or at a distance. As Wagner and Gerber (2011) have pointed out, the benefits of the 'symbiotic relationship' through a collaborative project include not only a shared resource program but also a shared result, responsibility and learning experience' (p. 278).

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# 13

# The Open University of Japan's MOOC platform: Features and outcomes

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Abstract: In 2013, MOOCs (massive open online courses) developed into a social trend in Japan. Top-class Japanese universities started MOOCs by joining the international consortia, Coursera and edX; universities and corporations launched the Japan Massive Open Online Course Consortium (JMOOC, http://www.jmooc.jp/en/) as a regional consortium. As a founding member of JMOOC, the Open University of Japan (OUJ) opened two MOOCs in the first releases from JMOOC. The one was *NIHONGO Starter* (Japanese Primer), which was based on the Japan Foundation standards; and the other was *Computer System: A primer*, which was remixed from an OUJ regular course.

The OUJ-MOOC platform was powered by the CHiLO Book system, which was developed by a Japanese NPO, CCC-TIES. It was constructed by mashup technologies of multimedia e-textbooks, LMS (learning management system) and social networking services (SNS); and it consisted of iBook or e-pub 3.0 packaging (e-books), Facebook (registration and learner community), YouTube (video delivery), Moodle (LMS) and Mozilla Open Badge (certification). In *NIHONGO Starter A1*, we plan to have five classes in this fiscal year (April 2014 to March 2015) with the same curriculum and course materials. As of 1st February 2015, the total number registered for Classes 1 to 5 was 3,642, including repeat registrations

The main issues in OUJ-MOOC were: (1) the scale of the course and (2) the sustainability of the project. The number of registrants was similar to

that of our regular courses at the OUJ and far from other major MOOCs. The results showed the difficulties of launching non-Japanese language services in an original brand from Japan and disseminating them to the world. In addition, although we plan to continue as a pilot research project hereafter, we have not yet found a clear roles and sustainable model in the University.

**Keywords:** open educational resources (OERs), massive open online courses (MOOCs), digital textbooks, learning analytics, international standards, open education

## 1 Introduction

It may be said that 2013 was the first year of MOOCs in Japan. After the spring, Japanese top-class universities, such as the University of Tokyo and Kyoto University, started MOOC projects by joining the global **consortia** (that is, Coursera and edX). Japanese universities and corporations launched the Japan Massive Open Online Course Consortium (JMOOC, http://www.jmooc.jp/en/) in November 2013. JMOOC is a 'General Incorporated Association' in Japan, i.e. an NPO/NGO. By September 2014, 59 full member (academic 29, public three and corporate 27), eight special contributing members and eight associate members had joined. JMOOC is maintained mainly by membership payments. As a founding member of JMOOC, the Open University of Japan (OUJ) developed two MOOCs in order to release them as the initial courses in April 2014.

OUJ is supported by the Bureau of Lifelong Learning Policies under the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) as the national centre for lifelong learning in Japan. As a unique open university in this country, OUJ has contributed to the Japanese open education and open educational resources (OER) movements (Yamada & Yoshida, 2010). The basic questions about MOOC — such as 'Can MOOC be a new sustainable model of open education?' and 'Will MOOC show a new delivery model of higher/tertiary education to reach potential lifelong learners?' — are also meaningful to the existing open universities. In order to examine the effects and influences, OUJ decided to launch the pilot MOOCs as a MOOC platform provider.
#### 2 OUJ MOOC platform: Main features

As of September 2014, JMOOC had three official platforms, 'gacco', 'OpeN Learning Japan', and 'OUJ MOOC'. 'Gacco' (http://gacco.org/) is an Open edX-based platform managed by NTT DoCoMo and NTT Knowledge Square; 'OUJ MOOC' is a multimedia e-textbook **taste** platform developed by CCC-TIES Consortium and managed by OUJ; and 'OpeN Learning Japan' (http://open.netlearning.co.jp/) is a domestic integrated learning support platform managed by Net Learning, Inc.

The architecture of the OUJ MOOC platform is shown in Figure 1. Considering the diversity of users' IT environments, we adopted a combination of e-textbook (specifically, e-pub 3.0 and iBook), traditional LMS (learning management system, specifically Moodle) and several social networking services (SNS). As some functions of e-textbooks can be used without connecting to the Internet, it was considered a better solution, especially in developing areas. We chose the 'CHiLO Book' system (Hori, Ono, Kobayashi & Yamaji, 2013), which was developed by CCC-TIES, as the OUJ MOOC platform because the system met our requirements. Each learner visited the online store or our server to download a series of e-textbooks and studied independently, using an epub viewer or a Web browser. The results of various quizzes and self-check exercises were stored automatically in the database of the LMS. In addition, Facebook<sup>TM</sup> was used for user identification and learner community maintenance. Using the 'Group' function, the provider can identify each user, and the learners can ask questions, exchange ideas and share knowledge among the community. We had two versions of e-textbooks - a video-embedded version and a video-streaming version. In the former version, while the users watch videos without the Internet connections, it takes more time to download. In the latter version, we used YouTube<sup>TM</sup> for video delivery. Using the Mozilla Open Badge system, we issued a 'small' badge in each lesson and finally gave a certificate when a learner had collected ten small badges (Yamada, 2014; Hori, Ono, Kobayashi, Yamaji, Kita & Yamada, 2014).



Figure 1 OUJ MOOC platform powered by CCC-TIES 'CHiLO Book' System: The concept

#### 3 OUJ MOOC platform: A case study of *NIHONGO Starter A1*

In order to examine the tasks and issues when an open university operates MOOCs, OUJ launched two pilot courses from April 2014 (Yamada, 2014). *NIHONGO Starter (A1)* is an English course for non-native speakers of Japanese who are preparing to study in Japan.

International students who have no experiences of Japanese language learning can learn basic Japanese in English, which covers various topics and scenes that students may encounter when they stay in Japan. 'Computer System' (Principal lecturer: Yoichi Okabe, President, OUJ) was developed using the course materials of his regular TV broadcasting course of the OUJ and only a Japanese language version was available. Both courses were free of charge.

*NIHONGO Starter (A1)* is based on the JF Standard for Japanese-Language Education (http://jfstandard.jp/pdf/jfs2010\_all\_en.pdf). The standard was developed by the Japan Foundation (JF) and has common definitions for six levels of language proficiency with CEFR (Common European Framework of Reference for Languages). The MOOC is a short course of ten lessons and corresponds to the first part of Level A1 of the JF Standard for Japanese Language Education (Table 1). Each lesson has two to four 'Candos' (competences). The estimated learning time is 45 minutes per lesson. The course texts were written by Ms Aki Shinohara, Ms Sachi Habuki and Ms Fumie Yanashima at the Japan Foundation.

 Table 1
 The goals of each lesson (The Japan Foundation, 2013a). The MOOC was based on JF Standard for Japanese-Language Education and the course book, 'Marugoto: Japanese Language and Culture (Starter A1)'. Italics show the lesson titles in Japanese.

	Lesson title		Can-dos
1	Hello!	(1)	Exchange greetings
	Konnichiwa	(2)	Recognize Japanese characters
2	Would you say that again?	(3)	Use basic classroom expressions
	Moo ichido onegaishimasu	(4)	Write your name and country in
			Japanese
3	Nice to meet you.	(5)	Give a simple self-introduction
	Doozo yoroshiku	(6)	Recognize the parts of a business
			card
4	There are three people in	(7)	Talk briefly about your family
	my family	(8)	Tell someone about your family,
	Kazoku wa san-nin desu		using a family photo
5	What kind of food do you	(9)	Talk about your favourite foods
	like?	(10)	Offer someone a drink
	Nani ga suki desu ka	(11)	Talk about your breakfast

6	Where are you going to	(12)	Say what your favorite dish is
	have lunch today?	(13)	Talk with a friend about where
	Doko de tabemasu ka		to go for lunch
		(14)	Read a menu
		(15)	Order food and drinks at a
			hamburger shop
7	There are three rooms in my	(16)	Say what kind of home you live
	home.		in
	Heya ga mittsu arimasu	(17)	Say what you have in your home
		(18)	Write an e-mail inviting someone
			to your home
8	It's a nice room.	(19)	Ask/Say where to put things in
	Ii heya desu ne		the room
		(20)	Visit / Welcome a friend
		(21)	Show someone around your
			home
		(22)	Recognize the name and address
			on signs
9	What time do you get up?	(23)	Say the time you do something
	Nan-ji ni okimasu ka	(24)	Talk about your daily routine
10	When is convenient for	(25)	Talk about your schedule for this
	you?		week
	Itsu ga ii desu ka	(26)	Talk about when to have a party
		(27)	Write a birthday card

In *NIHONGO Starter A1*, we planned to have five classes in the fiscal year (April 2014 to March 2015), with the same curriculum and course materials. As of 1st February 2015, the total number registered for Classes 1 to 5 was 3,642, including repeat registrations (Table 2). In Classes 1, 2 and 4, two lessons were delivered per week by regulating the access to course materials, while one lesson per week was given in Class 5. In Class 3, all the course materials were accessible from the beginning and the registrants could study them at their own pace.

Some registrants learned independently at their own pace, while others studied together in virtual group activities. In order to ask questions for the course team, and to have discussions among the participants, they could utilize both the class page at the Facebook<sup>TM</sup> and the forums at Moodle. From Class 3, we prepared Spanish and Arabic language forums in addition to the English language forum at Moodle.

We consider lifelong learners should be autonomous, manage their own learning process and be co-responsible, at least partially, for their outcomes. Reflecting both the results of quizzes in each lesson and the performance on various social interactions online/offline, the learners were asked to evaluate their own achievement by marking the 'Can-do' check at the end of each lesson. Using the Mozilla Open Badge (http://www.openbadges. org/), as stated earlier, we issued a 'small' badge in each lesson and a 'big' badge when they had collected ten small badges. We also issued an electronic certificate (Figure 2) to each 'big' badge holder on her/his request.



Figure 2 Example of the certificate

Class	Period	Pace-making	No. of registrants [Moodle/Facebook]
1	14 April – 18 May 2014	2 lessons /week	-/467
2	2 June – 7 July 2014	2 lessons /week	-/882
3	4 August – 13 October 2014	Self-paced	-/1475
4	3 November – 23 December 2015	2 lessons /week	353/249
5	12 January – 23 March 2015	1 lesson /week	120/96
		Total	473/3169

Table 2	Course schedule and the numbers registered on NIHONGO Starter A1 in
	FY2014 (April 2014 to March 2015, as of 1st February 2015)

#### 4 NIHONGO Starter A1: Progress report

#### 4.1 Responses from the community

The course had the community page on Facebook<sup>TM</sup> in order to disseminate the project to the public and to share the information among the community. According to the description by Facebook<sup>TM</sup>, 'Total Pages Likes is the number of unique people who like your Page', and it is regarded as a positive responses from the community as a whole. As of 7th October 2014, the top page of *NIHONGO Starter A1* received 6,209 'likes' and the demography of the 'fans' (the people who liked your Page) is shown in Figure 3 (age and gender), Table 3 (country) and Table 4 (language). Compared with other courses in JMOOC and from other OUJ-MOOC Facebook<sup>TM</sup> pages, both the ratios of the younger generation (18–24 and 25–34 years old) and that of 'women' were higher. The result may simply show that the preference on each MOOC depends on the content of the course, but we need more data to separate the effects **from other factors**.



- Figure 3 The demography of the 'fans' of *NIHONGO Starter A1* in Facebook<sup>™</sup> (n=6,209, as of 7 October 2014). The vertical axis shows the percent to total unique persons.
- Table 3
   The number of 'fans' of NIHONGO Starter A1 (as of 17th September 2014, Top 10, by country)

Country	Fans
Mexico	1,290
Japan	452
Cambodia	434
Colombia	426
Panama	409
Venezuela	209
Brazil	189
Serbia	151
Indonesia	144
Egypt	138

Language	Fans
Spanish	1,913
English (US)	1,897
English (UK)	484
Japanese	470
Spanish (Spain)	382
Portuguese (Brazil)	161
Indonesian	82
Vietnamese	81
French (France)	71
Arabic	70

Table 4The number of the 'fans' of NIHONGO Starter A1 (as of 17th September 2014,<br/>Top 10, by language)

#### 4.2 Multiple indices of the course registration

As of the 13th October 2014, the numbers of initial registrants in each class were 467 (Class 1), 882 (Class 2) and 1,495 (Class 3) and the total number was 2,844. While the total number was not sufficient as a MOOC, several other indicators showed a good performance. The numbers of the actual unique registrants in each lesson and 'Big Badge' holders in Class 3 are shown in Figure 4.



Figure 4 The numbers of actual unique registrants in each lesson and 'Big Badge' holders (As of 13th October 2014, Class 3).

#### 5 Discussions

#### 5.1 Characteristics of the registrants

Although we developed only an English version for *NIHONGO Starter A1*, the number registered from English-speaking countries was less than what we had expected, while those from Central and South America, East and Middle Europe and Arabic countries was more. This indicated that, in these countries, the opportunities to participate in Japanese language education were still limited. The MOOC showed a new way of reaching potential users **which had been postponed**. On the other hand, compared with the major surveys on the numbers of Japanese language learners overseas (The Japan Foundation, 2013b), the registrants from China and Korea were much smaller. We consider it depends on the kinds of social networking services and on language issues.

#### 5.2 How to realize the massiveness

Although the number of registrants increased gradually from Class1 to Class 3, it was still smaller than those of other initial JMOOCs. While we had only an English version of the course materials, the audience ranged across different language zones. Both JMOOC and OUJ-MOOC, which are still in preparation, will have dissemination channels to reach overseas and to increase their brand strength. Localization and multilingual versions are necessary for further dissemination.

### 5.3 International standards in e-Learning and digital publishing

While, as of October 2014, JMOOC had three official MOOC platforms, they had no clear interoperability with each other. However, one of the purposes of the JMOOC consortium is to provide high-quality MOOCs through collaboration among member organizations. In addition, all the platforms still need various functions to be developed, such as tools for learning metrics and analytics. The co-use of digital textbooks and LMS, and the **federation** of the databases and repositories, are also common issues. We examined how to participate in new international

standardization activities on e-Learning and digital publishing, such as EDUPUB (http://idpf.org/edupub-2013-report) and IMS Caliper (IMS Global, 2013), and how to utilize the international standards for our mission because our platform policy includes the concept of 'joint'.

#### 5.4 International collaboration in Asia and AAOU

Asian open universities have discussed a common collaborative framework for regional MOOCs and started discussion with MOOC consortia in other region. The community-oriented MOOCs try to realize their functions through cooperation among community members and sharing various resources — such as systems, tools, content, expertise and knowledge, and social networking — in order to reduce the cost. As Asian open universities are in diversified contexts, they need some flexible and adaptive solutions for collaboration to build up Asian MOOCs.

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## 14

#### 'Eeny, meeny, miny, moe' — open educational resources (OER) selection for English language skills proficiency at the University of the South Pacific (USP)

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Abstract: Open educational resources (OER) are increasingly being considered as a means through which the learning and teaching experience is enhanced, thus ensuring successful outcomes for both learners and teachers. According to Butcher (2011), OER is continuously being added on a weekly basis, which presents a major challenge for potential OER users in selecting suitable ones within a reasonable timeframe. The University of the South Pacific (USP) is owned by 12 member countries in the Oceania region which serves more than 20,000 students. According to Mugler (1996), English is the official language of instruction at the USP, but students who attend the institution are mostly second or third language speakers of the English language. Thus, providing appropriate and just-in-time support presents a grave challenge. The Centre for Flexible Learning (CFL) at the USP resorted to OER as a possible solution to this issue.

This paper focuses on the criteria utilized for selecting appropriate OER based on feedback solicited from the English Language Skills support personnel and CFL staff at the USP. In addition, it highlights other factors, such as licensing types and design viability; and these were further substantiated through tests conducted in six of the 12 member countries of the USP where students were expected to use these OER. It also discusses issues that arose related to the criteria being used. In conclusion, the paper outlines recommendations for improving OER selection endeavours which could be of value to education providers globally for choosing OER in general or specifically for English language skills proficiency.

**Keywords:** OER selection, English language skills proficiency, distance learning, the University of the South Pacific

#### 1 Introduction

The University of the South Pacific (USP) currently serves over 20,000 students in 12 developing countries in the USP region, which are Cook Islands, Fiji, Kiribati, Tonga, Tuvalu, Nauru, Niue, Tokelau, Samoa, Marshall Islands, Solomon Islands and Vanuatu. All of these are small-island, developing economies; located in 33,000,000 km<sup>2</sup> of ocean.



Figure 1 USP geographical region

English is the official language of instruction at the USP. However, students who attend the institution are mostly second or third language speakers of the English language (Mugler, 1996, p. 273), and this presents a major challenge in providing appropriate and just-in-time support. With the introduction of the bold, new USP Strategic Plan 2013–2018 (The

University of the South Pacific, n.d.), educators are faced with transforming all areas of learning and teaching (Koroivulaono, 2014).

USP first committed itself to OER in 2008 by engaging in the European Union-funded EDULINK SideCAP project. In this project, five institutions — the Open University (OU) of the United Kingdom, the University of the Highlands and Islands Millennium Institute (UHI) in Scotland, the University of Mauritius (UM), the University of the West Indies (UWI) and USP — worked together to adapt existing open content to local contexts using the relevant technologies (Koroivulaono, Lesuma-Fatiaki & Vakamocea, 2010). The USP's choice was a study skills module which currently is a useful, interactive, online resource for students studying in the USP region who wish to improve their essay-writing skills for tertiarylevel studies (*ibid*.).

In the last decade, technological developments have made enormous strides. In nearly every sphere of life, including education, the use of technology can be clearly seen, and the field of online language education is no exception (Murday, Ushida & Chenoweth, 2008).

The Centre for Flexible Learning (CFL) at the USP has been faced with the challenge of designing and developing appropriate English language support materials for the flexible learning students. CFL, therefore, formed a group which engaged in the selection of OER to help students in English language skills proficiency. The primary objective was to provide an online support framework for USP students, most of whom are not first language speakers of English.

#### 1.1 Background

Currently, it is compulsory for all students registering for degree-level courses — irrespective of their mode of study and whether they are taking a certificate, diploma or bachelor's programme — to sit the University's English Language Skills Assessment (ELSA) Test (The University of the South Pacific, 2012), which assesses whether they have the English language skills needed for successful university study. Table 1 describes the band scales used in assessing the performance of the students:

Band	Student profile	Implications for USP study
5	Complete proficiency in all academic skills tested	High level of English skills should be a great advantage in degree studies.
4	Good proficiency in most academic skills tested	Good English skills should be an advantage in degree studies.
3	Adequate proficiency in most academic skills tested	English skills are adequate to commence degree studies, and students will benefit from any explicit teaching in academic English (e.g. LL114).
2	Limited proficiency in some academic skills tested	Modest skills may affect success in degree studies; concurrent semester course in English language skills required (EL001).
1	Limited proficiency in all academic skills tested	Limited skills will probably lead to difficulties in meeting course requirements. Extensive concurrent individual support is required.

Table 1 Five - band scale

Source: http://www.usp.ac.fj/index.php?id=compulsory\_elsa

Those who score an overall total in (1) or (2) are then required to register for the course EL001: English Language Skills, in addition to their full course load for the semester. It is also compulsory for all students to study USP's generic course UU114: English for Academic Purposes which runs in three modes (face-to-face, print and online) in an academic year. Despite this effort by the University, it is evident in students' assignments that they still lack basic English language skills.

#### 2 Literature review

Open educational resources (OER) are 'teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions' (UNESCO, 2002). OER are continuously being added on a weekly basis, thus presenting a very significant challenge for potential OER users in selecting suitable OER within a reasonable timeframe (COL, 2011).

OER refers to the 'open provision of educational resources enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes. It includes open content, as well as software tools and standards. Access to these resources can play a vital role by 'supporting education in developing countries' (Geser, 2007) and by designing and presenting OER in different ways and mediums which are 'suited to the learners as much as the educators and the institution' (Lane & van Dorp, 2011).

Use of generic search engines, such as Google, Yahoo and Bing, for searching OER has been the most common practice. According to Pirkkalainen and Pawlowski (2010), searching in this way might be a long and painful process, as most of the results are not useable for educational purposes. This was evident in this project when the selected OER were vetted by the Student Learning Support (SLS) staff.

OER repositories are considered the 'heavy-weights of the OER movement where one can find large-scale repositories, including OpenCourseWare, DiscoverEd (run by the Creative Commons group), OER Commons and Merlot; and in the UK JorumOpen is an open content repository used by education institutions' (Rolfe, 2011).

One of the significant questions about OER is: 'Can learning resources designed for specific students in particular contexts be as successful in other contexts?' OER may also bring differential benefits in relation to particular 'modes of delivery' (COL & UNESCO, 2012). USP's context is a good example, where courses are designed in four modes — namely print, face-to-face, blended and online — and the real challenge lies in making sure that the content and delivery of a course serves the purpose that it is designed for. With the increased demand for more and more courses to be offered through the flexible mode at USP due to the increase in student enrolments, instructional designers have been working with the academics to repurpose OER in the course design.

#### 3 Selection of OER

A number of steps were involved in the selection of OER as represented in Figure 2, followed by an explanations for each of the steps.



Figure 2 Steps involved in the selection of suitable OER

#### 3.1 Step 1: Initial OER search

The first step taken was searching for OER using the OER repositories. It has to be noted that, due to the limited time and the urgency of applying for the funds that were available for a restricted period by the University through the Strategic Total Academic Review (STAR) project, the team involved in the selection of OER for English language skills had to resort to the easiest and fastest search options — hence the OER repositories were used. The licence type was not given much consideration as the main aim was to get as many resources as possible related to English language skills.

The selection team was given the task of searching specifically for OER for English language skills which had audio and video components, together with other formats. The target group was first year students at degree level, and the overall assumption was that students entering the University would already be equipped with basic English language skills acquired through pre-tertiary education or through Foundation level at the College of Foundation Studies (CFS) at USP. One of the reasons for this criterion was that Pacific Island students learn more effectively through audio and visual aids; and, through this project, the project team would also be able to test the accessibility of OER in the region which would inform the design of flexible learning courses.

#### 3.2 Step 2: Creation of OER list

The initial list was comprised of six OER which had audio and video components and five OER as PDF documents. The selection of the English language skills proficiency OER was based on language, content relevance and level of language, accessibility, suitability and its applicability to USP.

#### 3.3 Step 3: Vetting of OER list by Student Learning Support (SLS) Staff

The initial list was sent to the SLS staff of the University who then rated them out of 5 (1 being the lowest and 5 being the highest) in terms of the suitability of the content for USP student. Three out of five SLS staff participated in the vetting process. The SLS personnel are located within three faculties of the University and they provide academic support to all students so that their learning experience is easier, fun and worthwhile. As the English language is the main means of communication, assistance and support is targeted at communication skills in the four modes: reading, speaking, listening and writing. Therefore, they were requested to rate and provide feedback on the selected OER for English language skills proficiency study materials.

The feedback received from the SLS staff was as follows:

• Some of the readings are quite lengthy. Perhaps the readings should be limited to approximately six pages.

- Include OER videos on speaking and pronunciation, and it would be good to test the accessibility and connectivity as well.
- Some OER will initially require the student to work with staff for guidance.

#### 3.4 Step 4: Revised OER list

Drawing on the vetting results and feedback provided by the SLS staff, the OER list was revised. The final list included 27 OER which had a mixture of audio, video and PDF formats. At this juncture, the search expanded to include the use of generic search engines, such as the Google search engine. Various sources — such as Saylor.org Academic (http://www.saylor. org/courses/ engl001/) and the Writing Commons (http://writingcommons. org/open-text/writing-processes/develop-effective-writing-habits) — were selected at this stage as stand-alone, just-in-time English language modules (Koroivulaono, 2014).

#### 4 Underlying reasons for using such criteria

The title for this paper says it all — 'Eeny, Meeny, Miny, Moe'— and the steps described above further substantiate that this selection was done in haste; and, as mentioned earlier, the project team members were given a limited time to produce this list so that it could be included in the project proposal for funding. Another reason for using the selection criteria was the immediate need to address the ongoing issue of retention and low pass rates in USP due to lack of English language skills proficiency.

#### 5 Challenges

There were three major challenges in the selection process. Firstly, no clear guidelines were provided as to the level of content and English language skills the OER required. Due to this, the search for the OER varied in terms of different formats and levels of English.

Secondly, the lack of awareness and guidance on licensing types also affected the initial selection of OER. While there have been a few awareness workshops conducted at the University on copyright and licensing types, there is a need for more clarity, understanding and guidelines in this area that can help in the selection of relevant OER. Although there are thousands of OER available in the repositories, not having a good knowledge of licensing types can affect the selection of OER and may later create issues in this regard if the institution decides to repurpose them.

Thirdly, but not the least challenging, has been in ensuring that the level of English was not affected, or rather compromised, by the choice of the OER. Since the students are coming from the 12 member countries of the USP, their level of English language skills varies and this is dependent upon the type of education curriculum that each country follows. It was for this reason that the SLS personnel were consulted as their expertise lies in supporting students from such varied backgrounds. However, they were only consulted after the selection of the OER was carried out.

#### 6 Recommendations for OER selection for English language skills proficiency

Some of the recommendations for improving the selection of English language skills OER are as follows:

- Categorize the selection of OER by media format and material type e.g. audio, video, PDF, *etc.* This will help the users of the OER to use the most appropriate and accessible OER in the courses.
- The selection of OER should be based on the appropriateness of the content and accessibility, otherwise it defeats the purpose.
- Be informed about the different licensing types applied in OER.

#### 7 Conclusion

The OER search and selection process was significantly beneficial in that it proved to be a learning experience for the project team to engage in such a task. From the experience gained through this project in selecting OER, it is clear that OER repositories should be the first point of reference when searching and selecting OER for English language skills and the like. This work has provided compelling insights into instructional designers in particular, for designing flexible learning course materials for the students in the USP region. The selected OER are now being suggested to the faculty staff at the USP for use in their courses as self-study materials, and plans are underway to repurpose some of these OER. While there may have been reservations from some of the faculty members, it is encouraging to note that others have welcomed it, given that these OER can be of great benefit to students who lack appropriate English language skills at the higher education level.

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## **15** Open and distance learning and knowledge management

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Abstract: Knowledge management (KM) was the buzzword of industry in the late 20th century. With the rapid development of the World Wide Web and Internet technology, industry had high hopes that KM would help to transform productivity and the way we learn. Unfortunately, KM seemed to fall short of these expectations. Businesses have gradually been leaving KM and looking for other solutions. However, instead of dismissing the contributions and efforts of KM practitioners, it should be recognized that KM has actually evolved into many different modes and infiltrated into our daily processes. One examples can be seen in education, in the form of open and distance learning (ODL). While ODL in education was developed separately from the KM in industry, they are very similar in nature. Knowledge frameworks naturally existed in many of the learning and sharing processes. This paper discusses the inter-relationship between ODL and KM, and how processes in KM implementation are applied in ODL.

**Keywords:** knowledge management, open and distance learning, open learning, knowledge spiral, learning technology

#### 1 Introduction

Globalization was forced onto business organizations and created tremendous challenges and competition. The so-called 'knowledge age' which emerges after the 'industrial revolution' has been widely discussed and speculated upon. In the late 20th century, knowledge management (KM) has become the buzzword in the business world. According to Drucker (1993), knowledge is the only meaningful resource today, as compared with traditional resources, such as labour, capital and land. Nonaka (2000) argues that the success of the Japanese companies was due to the fact that they constantly sought new knowledge to bring about continuous innovation.

In the 21st century, knowledge management was thought to have fallen in popularity, as it was perceived to have failed to fulfil the high expectations of the business communities (Malhotra, 2002). Figure 1 shows that the number of searches for the term 'knowledge management' has been gradually reducing in the last ten years.



Figure 1 Google trends for 'knowledge management' (Google, 2014).

However, if we observe the trend in Internet usage, the explosion of social media, and the adoption of mobile applications, knowledge- sharing has intensified, instead of reducing. Hence, KM is very much alive, even though people have decided to use many other terms to describe KM activities.

Today, KM exists in many forms — social media, mobile applications, clouds and mobile devices play significant roles in KM activities. KM is also formalized into systematic learning processes in education, one of which is open and distance learning (ODL). ODL existed before the term KM was

coined, and in its original form was carried out by using mail. However, it has evolved into the modern form of ODL due to the emergence of the Internet and information technologies.

#### 1.1 Motivation

This paper was created out of an interest in revealing that the KM process is still alive and is being applied in ODL. ODL processes are mapped in accordance with a well-known KM approach.

#### 1.2 Aim and objectives

The aim of this paper is to study how KM practices are implemented through ODL, specifically in the course development and delivery processes in Wawasan Open University (WOU). The KM practices in this context refer to a model introduced by **Nonaka and Takeuchi** (1995). The objectives are to:

- relate KM practices to course development and course presentation processes;
- introduce the concept of 'value' to the ODL process; and
- suggest technology interventions in the current KM and ODL processes.

#### 2 Literature review

Knowledge is not a tangible object that one can grasp easily. The fluid nature of knowledge makes it very elusive, and certain form of visualisation are needed to describe how knowledge processes have taken place. This section presents some of the common perspectives on KM.

#### 2.1 Hierarchy of knowledge

According to Wallace (2007), there is a hierarchy that represents the relationships among data, information, knowledge and wisdom in information science (Figure 2).



Figure 2 Hierarchy of knowledge.

*Data*, consisting of symbols, signs, numbers, characters and figures, are considered the lowest form in the hierarchy. Data do not provide meaning as they need to be combined to form meaningful 'information'. *Information* is constructed from data with a purpose, and forms the basis for knowledge. *Knowledge* is information which is given contexts to relate to the real world. Therefore, knowledge constitutes the most useful part of the hierarchy, i.e. the 'know how' that enables users to act. Above knowledge, there is another level known as 'wisdom'. *Wisdom* represents an even higher level of intelligence, which is abstract in nature. Zeleny (2005) describes it as 'know why'.

The focus of this paper is on the first three levels, to observe how data and information can be transformed into useable knowledge.

#### 2.2 Types of knowledge

There are two types of knowledge, 'tacit knowledge' and 'explicit knowledge'. Explicit knowledge is a type of knowledge that we can codify and capture on paper, files, and databases, so that we can share it with each other. On the other hand, tacit knowledge is the part of knowledge that is embedded and hidden in individuals, which is hard to be articulated.

The ratio by a rule of thumb for explicit knowledge to tacit knowledge is about 20 to 80. Explicit knowledge is considered more useful as it can be shared and reused. It is possible to convert tacit knowledge into explicit knowledge through modern information technologies. However, tacit knowledge is so elusive that even the knowledge owners may not be aware of what they know, and so the conversion remains a big challenge.

#### 2.3 The SECI model

The KM model suggested by **Nonaka and Takeuchi** (1995) can be represented by a continuous information flow that involves the four KM quadrants: Q1: socialization, Q2: externalization, Q3: combination, and Q4: internalization. The KM model is also known as the SECI model (see Figure 3).



Figure 3 Nonaka and Takeuchi's SECI model

The four quadrants (Q1 to Q4) can be described as follows:

Q1: *Tacit to tacit* (socialization): This quadrant represents social interactive activities by members to exchange tacit knowledge. Tacit knowledge is shared through face-to-face conversations, for example in meetings, brainstorming, apprenticeship or informal discussions.

Q2: *Tacit to explicit* (externalization): The conversion of tacit to explicit knowledge is done through publishing or articulating knowledge. This process enables knowledge to be captured and shared without the presence of the owners. Externalization can be carried out in the form of written documents, illustrations and physical products or other creative media.

Q3: *Explicit to explicit* (combination): The creation of explicit knowledge can also be carried out by combining other available types of explicit knowledge. For instance, a literature review combines information from different publications to support new research; and a combination of old products will enable the creation of a new prototype.

Q4: *Explicit to tacit* (internalization): When an individual or a group learns from the explicit knowledge, and turns it into tacit knowledge, internalization is taking place. It also includes enrichment that adds more value to the original tacit knowledge. For example, a creative musician may combine his or her personal inspiration with a song learned from recorded music sources.

#### 2.4 Open and distance learning (ODL)

According to the Commonwealth of Learning (2000), there are multiple definitions of ODL. Perhaps the most basic characteristic of ODL is the 'separation of teacher and learner in time or place, or in both time and place'. The reason why there is no single definition for ODL is due to its rapid changes. With the emergence of new technologies and the increasing need to educate the masses, ODL has branched into multiple approaches.

Researchers have tried to make sense of ODL development in education. For example, Archer, *et al.* (1999) suggested that distance education is a form of disruptive technology in university education; Conole (2013) discussed the impact of massive open online courses (MOOCs) on higher education; and Moore, Dickson-Deane and Galyen (2011) studied different approaches, such as e-learning, online learning and distance learning. In this paper, the multiple definitions of ODL suggested by the Commonwealth of Learning (2000) are adopted.

#### 3 SECI model and ODL comparison

This section is intended to show the close resemblance between the SECI model and the WOU ODL operating processes. In fact, the ODL process is considered as a type of SECI process.

#### 3.1 SECI model in ODL

The overall course development process is as shown in Figure 4.



Figure 4 WOU course development process

In ODL, a course is initiated from the course blueprint. The course team needs to gather the opinions of the Malaysian Qualifications Agency (MQA), stakeholders, external experts, and education specialists to create a blueprint. The course, therefore, goes through discussion (socialization, Q1), writing (externalization, Q2), and researching and citing (combination, Q3). In this process, the coordinator and the course team go through learning (internalization, Q4), and return to the discussion process with peers and academic members for improvement. This may be repeated in a few iterations.

The blueprint is then assigned to a course writer, who shares his/her knowledge with the coordinator (Q1). Then, the writer goes through the the writing process (Q2), finding and extracting from references (Q3), learning (Q4), discussing with the coordinators (Q1), and repeating the cycle.

In addition to course coordinator, there is an External Course Assessor (ECA) who evaluates every unit that the course writer has completed. There may be discussions with the writer and coordinator (Q1). The ECA produces a reports for the writer and coordinator (Q2). In this case, the knowledge from the ECA will be channeled to the coordinator and the writer. The writer can then continue with the writing (Q3) iteratively until the units satisfy the ECA's requirements.

There are also course team meetings (Q1) to gather the inputs from other members in the course team for continuous improvement, and the same process is repeated until the course modules are completed. At the end of this process, the course will increase the explicit knowledge content. At the same time, the coordinator, ECA and course writer will also accumulate their tacit knowledge.

When the course is offered to the students, they go through the course material given to them and internalize the knowledge (Q4). Also, the students will be able to discuss the topics with the tutors and fellow students (Q1) in the monthly tutorial classes, in which additional tacit knowledge will be gained. Then, the students need to work on tutor-marked assignments (TMAs) by externalizing what they have learned (Q2). They may also include their own experience in the assignments (Q2); and may also combine additional information from books or the Internet (Q3), and learn from them (Q4). This is followed by discussion with the tutors, peers, or coordinator (Q1), and the process is then repeated. The cycle will be intensified when the deadline for submission is near, until the assignment is submitted (Q2). The most important result at the end of the process is that the students gain tacit knowledge that they can apply to their daily work, and perhaps transfer the knowledge to other new recipients.

Compared with the traditional learning method, ODL has an advantage in providing up-to-date tacit knowledge to the students, because, in ODL, external knowledge is constantly being updated through the tutors, who are mostly experts and practitioners in the related fields. They are the sources of live knowledge — otherwise, the students could only depend on the static course materials.

#### 3.2 Technologies in the SECI model

With the advancement of technology, the SECI process has been accelerated. The Internet and mobile devices enable continuous communication, even when the users are on the move. This ensures that the SECI process is executed at all times. For example, in socialization (Q1), the face-to-face interaction can be carried out even when the members of a group are not at the same place. Members with different language ability can also interact through language translation software.

We used to rely on pictures and texts to convey the explicit knowledge, but today, there are many sensory technologies, including cameras, microphones, and application software that help users to increase their capability in converting tacit knowledge to explicit knowledge (Q2). For instance, voice recognition software helps to capture narrations into text, and improved audio and visual technology helps to ensure that important images and sounds are captured. More and more tacit knowledge in the real world can be recorded as sharable explicit knowledge.

Editing software and hardware technologies ensure that multimedia information, images, video and voice can be easily combined with text documents to form an information-rich repository of explicit knowledge (Q3). These technologies have become more accessible to everyone — nowadays, even children are able to take part in the explicit knowledge combination process. The progress of open educational resources (OER) with a text-mining tool (Abeywardena, Chan & Tham, 2013) encourages more content combination processes to take place freely.

The explicit to tacit knowledge transfer process (Q4) does not rely on books alone. With the proliferation of the Internet, computers and mobile devices, the sharing of explicit knowledge has become a norm in modern society. Users can, for example, learn on the Web, mobile apps or e-books from their computer or mobile devices and, with adequate network coverage and memory storage, this can be done at any place and any time.

#### 4 Discussion

The educational system today faces a variety of challenges. Many have blamed the current system for producing students who are trained to answer examination questions, but are not equipped with real skills at work. This section touches on the value of the creation process students should go through to acquire real working skills.

#### 4.1 The knowledge spiral

From the perspective of the SECI model, knowledge that does not provide skill improvement stays at the two-dimensional SECI plain. There is a third axis perpendicular to the plain that shows the advancement of knowledge. **Nonaka and Takeuchi** (1995) suggested the knowledge spiral shown in Figure 5.



Figure 5 The knowledge spiral.

The knowledge spiral represents the value created by people in the third axis perpendicular to the plain of the four knowledge quadrants. The arrow, which shows the direction perpendicular to the knowledge plain, points towards the increase in values of products and services.

The educational objective is achieved through the experience students go through in planning, designing, and problem-solving for value creation. Through this process, learning is no longer hypothetical, and the students will gain tacit knowledge through the learning experience and provide practical contributions in their projects.

#### 4.2 Further suggestion for the SECI model

The author would like to suggest an addition form of explicit knowledge, i.e. the creations resulting from knowledge. For example, a physical product (which is designed to perform a certain function) can be considered as a form of explicit knowledge. Knowledge can be conveyed through its usage, by study the design of the product, and deriving inspiration from it..

A 'combination' quadrant usually refers to the writing activities that help to put different articles together to form a new publication. However, in terms of physical objects, an assembled product can be considered as a form in Q3. The product contains information on usage and design and so, as a user uses the product, tacit knowledge is derived from it through the user's experience (Q4). In the author's view, learning from real-world products may have an even greater impact than learning through documents and publications.

ODL has taken advantage of the Internet to improve its reach to more students. However, the main course materials are still mostly text-based. A conscious effort to introduce appropriate technologies will help to accelerate the evolution of ODL education. Instead of relying on text-based materials, multimedia or even physical products can be used as learning materials; and the students could also submit their assignments using alternative forms when appropriate.

#### 5 Conclusion

KM has become an integrated part of the modern world. Even though the term is not often mentioned, it has evolved into countless processes in our lives. ODL is a form of KM process that has been enhanced by the advances in information and communication technology. The KM practices in ODL can be observed through the SECI model. The practice of KM will benefit from the experience gained in the continuous knowledge cycle.

The advances in technology have helped to accelerate knowledge transfer through various forms of explicit knowledge conversion. However, technology and explicit knowledge must not be the main focus of educators. The most important objective is to accelerate the formation of tacit knowledge in each student to add greater value to society.

ODL, as a form of the KM process, can help to create learning cycles and translate learning into real-world value. As ODL has a much bigger reach to a larger population than traditional education, the adoption of a value creation approach in learning will make an even greater impact on the world.

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# 16

#### The design of economical blended mobile learning with a short message service (SMS)

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Abstract: As mobile devices become daily necessities, almost all students have their own mobile devices, especially cellular phones and smartphones. A mobile ecosystem increases competitiveness and has an influence on our daily lives, especially e-learning. However, mobile devices are not cheap and mobile communication fees are very expensive, and so could create a digital divide between the rich and the poor — an issue which needs careful planning and continuous monitoring. Mobile communication services, such as SMS (short message service) and MMS (multimedia messaging service) are very efficient and useful e-learning tools. MMS is certainly more efficient than SMS, but its receiving and sending fees are still high, while with SMS receiving is free.

In this paper, the authors propose new blended e-learning scenarios that use SMS for learning instruction and feedback to students. Students receive SMSs from lecturers and tutors without cost; and they respond to the lecturers'/tutors' instruction without cost on their desktop computers. There are two kinds of SMS — one for homework, references and class events; and the other for pop-up quiz and short-answer tests. Because of free SMS, our blended mobile learning scenarios can support a more interactive e-learning environment between lecturers and students. With SMS, we have designed blended scenarios for examinations, assignments
and tutorials, and a blended learning 'activity encouragement' scenario. SMSs can be made by an automated tutoring system that traces students' learning activity. The blended e-learning scenarios will help to improve the learning conation and motivation of students, especially those who are financially disadvantaged.

**Keywords:** distance learning, economical mobile learning, SMS, blended e-learning, cellular phone

#### 1 Introduction

As wireless and mobile communication technologies have developed rapidly, various mobile communication devices (e.g. smartphones and touchpad computers) are easily and cheaply produced and sold. The demand for mobile content services has increased tremendously, which means that there will be big demands for mobile learning contents and various mobile learning scenarios in e-learning environments. There is no doubt that a mobile learning environments will be useful and efficient for students' learning stimulation and accessibility. Thus, mobile learning has become the focus for many students and teachers, while its effectiveness and efficiency have been viewed positively by instructors in Kotecha et al. (2012) and Rekkedal and Dye (2009). According to recent research conducted by Park (2011) and Chung, Hung and Chow (2014), technological attributes and pedagogical affordances play an important role in assisting teaching and learning for a mobile environment. However, in order to construct mobile learning environments, students may have to pay for high-cost mobile devices and mobile communication fees, and the university and the government may have to invest heavily in mobile learning systems. In addition, there are still many other problems and barriers to implementing mobile learning. There may need to be significant changes in legacy e-learning environments and university e-learning policy, and learning contents modifications. Lastly, Dye (2009) and Peters (2009) insist that mobile learning could create inequities among the students.

In this paper, we propose an economical blended mobile learning strategy for Wawasan Open University (WOU) by using a short message service (SMS). SMS can be provided to the students free, and so doesn't put any financial burden on them. Using SMS, students can receive real-time notices from lecturers and tutors; and when they receive SMS notices from them, students can react in real-time for activities such as assignment submission, examination preparation, and learning progress. Lastly, we suggest a mobile stimulation strategy — a basic personalized learning care method — with SMS. Relevant SMS notices are sent to the students according to their learning progress, and they will feel the personal learning care of their tutors and lecturers.

The rest of this paper is organized as follows. In section 2, we analyze previous related work and research. In section 3, the proposed economical blended mobile learning services are described, and we introduce the service and message flows for the economical blended mobile learning services for Wawasan Open University. Finally, in Section 4, we draw conclusions.

#### 2 Related work

The usual mobile learning services focus on the efficiency of e-learning and accessibility, so the previous mobile learning environment was based on the MMS and 3G/4G mobile network, which can support real-time e-learning content delivery. However, those kinds of environment place a burden on students with high-costs and expensive smartphones, which make it hard to take up these mobile learning services. Rekkedal and Dye (2009) therefore suggest SMS as the main communication between learning content and students as the asynchronous communication reduces the students' communication costs, and they can respond to the e-learning portal or submit assignments in real-time. In Peters (2009) and Kukulska-Hulme and Pettit (2009), mobile learning services with SMS were used as communication tools for short questions and answers, short text resources, and alerts. Finally, Chung et al. (2009, 2010) proposed and implemented a smartphone-based digital textbook for a distance learning university, but it was expensive; and so Chung, Kim and Byun (2011), Chung, Ardiasih and Yu (2013), Chung, Hung and Chow (2014) and Chung, Teng and Menon (2014) proposed an economical mobile learning service.

# 3 The design of the economical blended mobile learning service

WOU's blended mobile learning support service aims at economical mobile support for students with SMS, and real-time-like interactions between tutors and students. This service is basically free for students, since SMS can be delivered free to them in almost real-time. The goals of this support service are:

- 1 real-time learning feedback to students with free SMS, combined with legacy WOU learning scenarios that neither need to be revised nor modified;
- 2 blended mobile learning support models for various WOU learning activities and feedback among lecturers, tutors and students; and
- 3 encouragement to students to participate in examinations, assignments and tutorials.

The blended mobile learning service aims at SMS-based interactions between lecturers and students, and free personalized learning activities for students, as shown in Figure 1. And the goals of this blended mobile learning service system are (1) tracking and analyzing students' learning activities; (2) selecting and sending appropriate stimulation SMSs for a student; and (3) analyzing tracking interactions and learning actions of the student. The proposed service motivates students to participate in online learning activities.



Figure 1 Blended mobile learning service

In Figure 1, the information between students and the SMS server is the teacher's requests and survey items; the information between students and the student portal server is multimedia learning contents downloaded and uploaded by students (reaction of students, homework, academic materials, *etc.*); and the information between the the teacher and LMS is the result of students' learning activities and learning activities tracking information.

#### 3.1 Advanced mobile examination support service

The advanced mobile examination support service delivers SMS notices for examination. These notices, and later the examination scores, are sent to students by an external SMS server.



Figure 2 Advanced mobile examination support service flow



Figure 3 Advanced mobile examination support service message flow

Figures 2 and 3 outline the following process:

- 1 Students receive an examination notice (examination date/time/place, examination coverage and examination methods) that are predefined by tutors and lecturers at the beginning of the term. The examination notice is served by an external SMS server.
- 2 After receiving the examination notice, students take their examination at the WOU branch.
- 3 Examination scripts are gathered at the WOU Registry Office.
- 4 Examination scripts are delivered to lecturers or tutors who mark them.
- 5 After marking the scripts, lecturers or tutors input the scores and grades.
- 6 The WOU Registry Office delivers the scores and grades of the examination scripts to the WOU Student Portal server.
- 7 The scores and grades of the examination scripts and correct answers are delivered to the students.

#### 3.2 Advanced mobile assignment support service

The advanced mobile assignment support service delivers assignments and SMS notice about assignments to students. These SMS notices include the assignment due date, coverage and references of assignments. They are relayed by BTS (base transceiver station) to students' cellular phones.



Figure 4 Advanced mobile assignment support service flow



Figure 5 Advanced mobile assignment support service message flow

Figures 4 and 5 illustrate the following process:

- 1 A lecturer uploads an assignment on the WOU student portal server.
- 2 Students log on to the WOU students' portal server and confirm their assignments.
- 3 After confirmation, the students submit their assignments to the OAS.
- 4 The OAS requests the SMS notice for tutors who mark and grade the students' assignments. A lecturer reviews and moderates students' assignments.
- 5 Students receive the SMS notice for their assignment scores and grades from an external SMS server. SMS notices for assignment scores and grades are requested by the WOU student portal server.

#### 3.3 Advanced learning tutorial service

The advanced learning tutorial service delivers course materials, course supplementary and reference materials to students. It also sends SMS notices about source materials and pop-quizzes.



Figure 6 Advanced learning tutorial service flow



Figure 7 Advanced learning tutorial service message flow

In Figures 6 and 7, the message flow is as follows:

- 1 Lecturers upload course materials and references on the WOU students portal server.
- 2 Tutors upload course references and supplementary materials on the WOU student portal server.
- 3 SMS notices for source materials are sent to students and students log on to the WOU students' portal server and download their uploaded course materials and references.
- 4 Occasionally, students post their questions on the Class Forum WOU student portal server.
- 5 Lecturers and tutors answer the students' questions on the WOU student portal server.

- 6 The students' questions, and lecturers' and tutors' answers, are exchanged through e-mail and cellular phone.
- 7 Lecturers and tutors upload pop quizzes onto the WOU student portal server.
- 8 The pop quizzes are sent to students through the SMS server; and a few days later, the answers are sent to them through e-mail and cellular phone.

#### 3.4 Advanced Learning Activity Encouragement Service

The advanced learning activity encouragement service, which uses SMS notices for student stimulation, is newly proposed in this research. SMS notices about this service can be sent periodically or occasionally according to the scores and grades for the examination, assignments and homework submission frequency, and students' personal learning progress.



Figure 8 Advanced Learning Activity Encouragement Service flow



Figure 9 Advanced Learning Activity Encouragement Service message flow

In Figues 8 and 9, the flow is as follows:

- 1 A lecturer inputs the WOU learning activity schedule for a subject on the WOU student portal server, which requests an SMS notice from the external SMS server.
- 2 Periodically/occasionally, the SMS notices for Learning Activity Encouragement are sent to the students.
- 3 If a student receives an SMS notice for the students' Learning Activity Encouragement, he/she can log on to the WOU student portal website for his/her learning activity. The WOU student portal server analyses and classifies students' learning activities and, based on the results, the SMS notice for Learning Activity Encouragement is sent to the student.

#### 3.5 Interaction and feedback model

At the beginning of each term, an instructor inputs the definition of the personalized feedback table and messages for students according to subject and activity, and considers the students' competiveness and competency, learning history and previous subjects scores. Then the LMS requests the SMS server to send personalized SMS feedback to each student, which can be decided by the results of students' learning activity and examination

scores. A 'learning activity' is defined as the extent of a student's class participation, consisting of homework submission activity, lesson material and contents download activity, and participation in online forum Q&As. From an analysis of a learning activity, a student's learning characteristics can be inferred and SMS contents and types can be decided.

The personalized feedback is defined according to learning activity tracking information, as seen in Table. 1.

LEARNING ACTIVITY		
Information	Activities	Level
Dynamic LEARNING ACTIVITY Iiinformation	Homework activity	High
	Download activity	Middle
	Q&A activity	Low
Static LEARNING ACTIVITY I information	Last term's homework activity	High
	Last term's download activity	Middle
	Last term's Q&A activity	Low

Table 1 Learning activities level definition

Dynamic Learning Activity information is a student's learning activity that can be modified during the present term; and Dynamic Learning Activity information is homework activity, download/upload activity, and Q&A activity.



Figure 10 Learning activity grading in current term



Figure 11 Learning activity grading in the last term

In Figures 10 and 11, students' learning activity is classified into nine grades, according to which personalized feedback (SMS) is given. The learning activity can be inferred from homework submission, lesson material and content download, and online forum Q&A participation. There are three kinds of grades: high-level, medium-level, and low-level participation. Thus, high homework activity, high download activity and high Q&A activity mean that the student is very active and his/her learning activity is 3-H.

Static learning activity is the current term's learning activity — including the examination and homework scores in Figues 10 and 11 — and is not modified during the current term. According to the combination of students' dynamic learning activity and static learning activity levels, the LMS automatically requests personalized feedback to students.

#### 4 Conclusion

We propose an economical WOU mobile learning service that combines WOU's offline learning scenarios with SMS between students and lecturers. The proposed learning services do not include high communication costs and expensive smartphone for students. Students can be encouraged in their learning progress and tutor engagement, and receive timely reminded of their assignments. For this service, the WOU learning scenarios were analyzed and various staff were interviewed. First, we analysed WOU's subjects titled 'Total Quality Techniques' and 'Programming Fundamentals with JAVA'. From the interviews with WOU staff, we extracted several results: (1) mobile learning can be useful to WOU students; mobile learning must not get students burdened with a mobile communication fee and cellular phone cost; and (3) the mobile learning system can be easily integrated with WOU's existing LMS. The mobile learning services for encouragement and stimulation is not cheap and is costly for students, so a mobile service plan that does not incur a high communication cost is suggested.

We proposed four blended mobile learning scenarios and service flows that consist of students, lecturer, an external SMS server and a 2G/3G cellular phone for SMS. With the proposed system, the students receive and read SMS notices for assignments, examinations, encouragement, and tutorials. They can join the WOU learning tutorials, submit their assignments and take the examinations. The SMS enhances the interaction between the students and their lecturers; and the WOU economical mobile learning system increases the interactions among the students, lecturers and tutors.

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# Building an effective automated assessment system for C/C++ introductory programming courses in an ODL environment

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Abstract: The assessment methods and timely feedback are considered to be major factors in building top-class open and distance learning (ODL) institutions (Gibbs, 2010). However, with the massive enrolment of students in such institutions, manual assessment is becoming very difficult in terms of time, effort and cost (Sangi, 2009). In such environments, peer assessment (Deimann & Farrow, 2013; Garcia, 2012; Revere & Kovach, 2011) is being utilized to deal with these problems. However, in peer assessment, detecting situations of conflict of interest between students might not be easy every time. The availability of automated assessment tools to evaluate students' tasks is a promising solution to address these difficulties. As mentioned in Amemado (2014), with the wide spread of the Internet and related technologies, the use of automated assessment tools in ODL is becoming very important. Although tasks for all types of courses cannot be checked automatically, courses that have some strict language of expression can be automated, for example programming courses in the computer science (CS) domain.

Programming is an essential part of CS, and even in other academic disciplines. Practice is the key to learn programming, for which teachers provide assignments with programming problems to be solved. Usually, instructors grade and provide feedbacks manually on these assignments, but this very time-consuming process needs to be automated for various

programming courses, especially for introductory ones. This study attempts to identify different components that might be necessary for building an effective automated assessment system for assessing the assignments of introductory programming courses that involve C/C++ languages. It also discusses an important software architecture technique that can make assessment systems flexible and reusable for other applications. Also, some standards that can help in standardized searching and sharing of assessment objects are highlighted, and reported techniques for secure sharing of such objects are described.

Keywords: assessment, programming, open and distance learning

## 1 Components for developing an effective assessment system for C/C++ programming assignments

This section describes various important components for building an effective automated assessment system for C/C++ programming assignments in introductory programming courses. All these components can generate valuable feedbacks for students that can be delivered to them along with the teacher's comments.

#### 1.1 Program correctness evaluation

It is very important for an assessment tool to check whether a student's program performs the required functionality (Ala-Mutka, 2005). This is done by testing the program with test data (input-output combination) provided by the teacher (*ibid.*). The manual generation of test data is very tedious. Although it is not possible to test all inputs for a given program, there are approaches that try to minimize inputs by using different input variations to identify maximum errors (Myers, 2004). Two well-known approaches for program evaluation are equivalence class partitioning (ECP) and boundary value analysis (BVA). In ECP, inputs are partitioned into two disjoint classes, valid and invalid values (Myers, 2004), whereas, in BVA, the upper and lower boundaries of input are used as test data (Jorgensen, 2002; Myers, 2004). Experience shows that most of the errors occur at the boundaries and for values that exist above and below these boundaries

(Myers, 2004). The example of test data generated by both techniques for an input variable, the value of which ranges from 1 to 10, is as follows:

ECP: invalid classes→11, 0, valid class→5 [adapted from (Myers, 2004)]

BVA: 0, 1, 2, 10, 9, 11 [adapted from Jorgensen (2002) and Myers, (2004)].

In practice, both techniques are used together (Jorgensen, 2002). Unfortunately, any open source tool that can generate such data could not be found. For automated assessment, one needs to implement these techniques oneself. The test data generation becomes complex when more than one input variables is required. In this case, testing a program thoroughly requires all possible combinations of test data values which can be quite large and not feasible for automated assessment. However, it has been observed that most of the errors in software usually occur due to a combination of some variables (up to a six-way combination) (Leung, 2014). Therefore, as reported by Leung, test cases can be generated by using the combinations of subsets of all variables. There are various open source tools for addressing the test case combinatorial problem, for example PICT<sup>1</sup>, Jenny<sup>2</sup>, and AllPairs<sup>3</sup>.

#### 1.2 Static analysis of code

The static analysis of code helps in identifying those errors that cannot be detected by typical compilers and can remain unnoticed even after several executions. However, identification of these errors is necessary as they can create problems at any time in the long run. These errors include memory leaks, unidentified infinite loops and out of boundary. To enforce good programming practices, these problems need to be highlighted for programming students as errors/warnings. There are three open source tools that can help in highlighting these errors in the context of C language, viz.

<sup>1</sup> http://msdn.microsoft.com/en-us/library/cc150619.aspx

<sup>2</sup> http://burtleburtle.net/bob/math/jenny.html

<sup>3</sup> http://engineering.meta-comm.com/allpairs.aspx

Splint (Secure Programming-Lint)<sup>4</sup>, Memwatch<sup>5</sup>, and CppCheck<sup>6</sup>. However, it must be noted that CppCheck is the only tool that also supports C++. There are many checks that are supported by these tools, but it is not appropriate to report on all of them for students on an introductory programming course. The list of checks that might be sufficient, along with the tools that support them, is as follows:

- Memory leak (Splint, CppCheck, Memwatch)
- Dangling reference (Splint, CppCheck)
- Infinite loop (Splint, CppCheck)
- Boundary check (Splint)
- Unreachable code (Splint)
- Incomplete switch (Splint)
- Return values that are never used (Splint)
- Variables not used (Splint, CppCheck)
- Functions not used (CppCheck).

# 1.3 Grading on the basis of semantic similarity with model solution(s)

Similarity checking of students' solutions with model solution(s) is a key task in assessment for grading and providing feedback. It can help in grading a program on the basis of whether it meets some design specifications (for example, modularity) (Vujosevic-Janicic *et al.*, 2013). It can also help in evaluating programs that are incomplete or execute infinitely (Tiantian *et al.*, 2007) or are unable to compile/execute. In this context, important work, among others, has been done by Vujosevic-Janicic *et al.* (2013), who used the concept of 'a control flow graph' (CFG) which represents a program's structural flow; and according to the authors, the graph consists of nodes where each node represents a sequence of codes. They used control and iteration statements to determine the nodes'

<sup>4</sup> http://www.splint.org/manual/manual.html

<sup>5</sup> http://www.linkdata.se/sourcecode/memwatch/

<sup>6</sup> http://cppcheck.sourceforge.net/

topology, and used a 'neighbour matching' algorithm for identifying similarities, arguing that this algorithm possesses capabilities that are very valuable in comparing a student's solution with a model solution or solutions. Besides a graph-based approach, in our opinion, the token matching approach described in section 1.5 can also be explored for determining semantic similarity of solutions.

#### 1.4 Programming style checking

The coding style of programmers plays a vital role in software development and its maintenance. Different institutions and projects follow either already available standards or develop their own homegrown coding specifications. Without such standards, it becomes hard to understand or change the code by other programmers and, even in some cases, by the original developers themselves. Studies by Zaidman (2004) and Ala-Mutka, Uimonen & Järvinen (2004) show that students found the teaching of programming standards very valuable. According to the literature, there is no single standard available for programming styles. One of the primary works related to coding standards was carried out by Dromey, who provided a framework to associate code level attributes to 'high-level' software quality attributes, such as: reliability, efficiency, functionality, maintainability and reusability (Dromey, 1995). Later, Uimonen performed a similar kind of analysis and linked source code features with software quality attributes (as cited in Ala-Mutka, Uimonen & Järvinen, 2004). Also, Oman and Cook (1990) provided a taxonomy of programming styles after conducting an extensive literature survey and reviewing code evaluators. Their style classification includes: (1) typographic style, (2) control structure style, and (3) information structure style.

Researchers have also put an effort into developing automated analysers to check the programming style for different languages — for example, STYLE and CAP tools for PASCAL, PASS-C for C, and STYLE++ for C++ language (Ala-Mutka, Uimonen & Järvinen, 2004). However, it must be noted that PASS-C is a commercial product. Moreover, we could not find the downloadable binaries or source code of Style++. We found one such tool

for C and C++ languages called 'nsiqcppstyle'<sup>7</sup>, but this tool provides very few checks. There is a need to extend this tool or build an entire new style checker for C and C++ languages. A typical approach for implementing these checks would be to parse the abstract syntax tree of any given code.

#### 1.5 Source code plagiarism detection

It is a common belief that plagiarism is much easier in ODL (Simonson, 2012; Weller, 2000). The presence of plagiarism in students' programming assignments hinders true learning and must be discouraged. There are various types of changes or transformations that can be adopted by students (for example, see Bejarno, Lucy & Zurek, 2013; Liu et al., 2006; Prechelt, Malpohl & Philippsen, 2002). There are four broad techniques for automated identification of plagiarism in programming, viz. metricsbased techniques (Mozgovoy, 2006), token matching (Cosma & Joy, 2012), graph-based matching, and abstract syntax tree based techniques (Liu et al., 2006). Currently available tools adopt a token matching approach due to its simplicity, efficiency and accuracy. According to Cosma & Joy (2012), in the token matching approach, the source code is first converted into a standard set of tokens; and the line of codes which belong to same family of instructions are given the same tokens. For example, for control structures 'if-else', switch statements are given the same token name. The tokens of two sets of source codes are then compared to determine their similarity (ibid.), using a similarity function (Prechelt et al., 2002). The YAP3, Sherlock and JPlag are well-known tools that adopt this technique (ibid.). The authors of YAP3 utilized a novel algorithm for token matching called the 'greedy string tiling algorithm' (Wise, 1996), the purpose of which is to identify statements reordering and conversion of a function in more than one functions type of cheatings (Cosma & Joy, 2012). Among the tools that were described earlier, JPlag is accessible as a Web service. The Sherlock system is claimed to be part of the BOSS assessment system<sup>8</sup>. The source code of Yap3 is available for non-commercial use from its website<sup>9</sup>.

<sup>7</sup> https://code.google.com/p/nsiqcppstyle/

<sup>8</sup> http://www.dcs.warwick.ac.uk/boss/history.php

<sup>9</sup> http://luggage.bcs.uwa.edu.au/~michaelw/YAP.html

However, Yap3 provides a tokenizer for only C language. To use Yap3 for C++ language, two open source tokenizers can be explored:  $Flex^{10}$  and Quex11.

To pursue plagiarism cases, good visualization techniques for displaying the results are also necessary. For example, in JPlg the results are presented in terms of histograms where each histogram represents the similarity between two source codes pairs (Prechelt *et al.*, 2002). According to Prechelt *et al.* (2002), to further explore the results, the user can view two source codes in side-by-side comparison windows, where matching lines are highlighted using similar colours; and by clicking hyperlinks near matching lines on either window, the view in the other window automatically jumps to its corresponding code. Similarly, the box plot technique can also help in identifying copying cases by differentiating them from the source codes of the rest of the students (Cosma & Joy, 2012).

#### 1.6 Miscellaneous

There are many other important features that can be evaluated in the context of programming assignments for grading and feedback. They may include, for instance, lines of code, memory usage, efficiency in terms of CPU time (Ala-Mutka, 2005). Their implementation does not require much programming effort.

### 2 Service-oriented architecture (SOA) for flexibility and reusability of components

Until recently, most of the software design architectures were monolithic. This approach imposes strong restrictions, for instance difficult integration with other software tools, and less interoperability and reusability of various software components. Service-oriented architecture (SOA) is a promising architecture to solve these problems by providing loose coupling between modules/services (to support module replacement with other module); reusability of modules; and easy adaptations in software

<sup>10</sup> http://flex.sourceforge.net/manual/Cxx.html#Cxx

<sup>11</sup> http://quex.sourceforge.net/index.html

in response to changes in business workflows. SOA can really help in integrating different learning environments to provide already available required facilities to learners and teachers (Conde *et al.*, 2012), especially in ODL environments. In the context of this article, we find the work of Amelung, **Krieger and Rosner** (2011) to be one of the few cases that explains adequately the development of SOA for an automated assessment system for programming assignments. We describe it in some detail in the following paragraph.

In compliance with SOA, Amelung et al. (2011) considered various testing solutions as Backends, for instance JUnit for Java and QuickCheck for the Haskell programming language. According to authors, these Backends are basically self-contained Web services provided securely over the standard Internet protocol using Python's XML-RPC server API. They used the term 'Frontends' for GUIs that invoke Backends. They support two GUIs: ECAutoAssessmentBox and light weight Java Frontend: Stand-Alone Thin Client. According to them, Frontend performs functionalities, such as: (1) storage of assignments, their solutions and courses; (2) the configuration of courses and assignments; and (3) the status and statistics of submitted assignments. To make the architecture flexible and enable loosely coupled integration of Frontends and Backends, the authors used another component named Spooler, which acts as an intermediary between various Frontends and Backends, providing uniform access to Backends. They further state that this Spooler is, in fact, similar to the printer spooler which: (1) controls a submission queue of service requests by Frontends; and (2) manages the result queue of outputs to be sent back to Frontend generated by the corresponding Backends.

# 3 Sharing assessment questions in compliance with IMS GLC

IMS Global Learning Consortium (IMS GLC) is 'a global, nonprofit, member organization that strives to enable the growth and impact of learning technology in the education and corporate learning sectors worldwide' (IMS Global, **2014**). As reported on its website, since its inception, the consortium has introduced 20 standards in the field of educational technology. For example, the IMS Common Cartridge (IMS CC) is to share and reuse learning objects (IMS CC, 2014a) and IMS Digital Repositories Interoperability (IMS DRI, see IMS DRI, 2014) is a standard for querying or searching a learning objects repository in a standard way (Queiros & Leal, 2012). The implementation details of these standards for programming questions as learning objects for automated evaluation purposes have been demonstrated in Queiros and Leal (2012). By following these standards, other applications (other evaluation engines, learning management systems) can reuse a repository of programming exercises and other metadata related to them, such as marking schemes, learning objectives, complexity, source code solutions and test cases. Similarly, they can add their own exercises in a shared repository. If required, the assessment system can then respond to them by providing results of evaluation. However, the IMS does not provide any specification related to the response results, and any particular assessment systems can use their own format of reply (ibid.). IMS also provides a Questions & Tests Interoperability (IMS QTI) standard for sharing questions and their results between different systems (IMS QTI, 2014). However, it is not capable of dealing with programming evaluation requirements, such as test cases and marking scheme (Leal & Queiros, 2009).

#### 4 Secure sharing of assessment objects

Teachers within or across institutions share their expertise, experience and resources with each other for the betterment of students. ODL institutions can benefit from international collaborative teaching (Johnson, **Frondigoun & Jones**, 2013). In the case of automated assessment systems, the sharing of programming exercises and their related metadata can be very helpful in raising the standards of education across various institutes. The IMS standards are the means to achieve this goal. By utilizing the collective intelligence of teachers, such sharing can also help in creating a repository of open educational resources (OER) for teachers. In general, teachers can share these resources in two modes: protected–share with a specific group of colleagues or friends, and public mode–share with everybody. However, such sharing must be secured to ensure access to legitimate users only. The IMS standard itself provides an authorization mechanism for IMS CC specifications (IMS CC, 2014b). Also, the work by Ahmad and Whitworth (2011) can be used to secure resources. By extending this work, we provide a generalized policy for secure sharing of resources as follows:

Let  $\delta$  consist of two states named as Public (Pb) and Protected (Pr).  $\sigma$  computes the access request decision and has two states — Allow (a) and Deny (d).  $\sigma$  also has two functions, to map T to Pb, and T to Pr, so that it can decide on the result of a request. If some teachers' policy states that the Public and Protected members can only access some particular course materials, then the access control policy  $\Lambda$  may follow these rules:

- 1 If a teacher *T'* has a mapping to the domain *T*, then it becomes the member (*M*) of the domain, or else it remains a non-member (*Nm*).
- 2 Objects (O) belonging to T are assigned a security clearance label (L) to show the sensitivity of the object. These labels are used to share material with other teachers in a public and protected role.
- 3 If T' as a member of domain D(T) requests (a) an object for which he/ she has clearance, the request will be allowed or (b) an object he/she does not have clearance for, the request will be denied.
- 4 If T' is not a member of domain D(T) and requests an object, then the request will be ignored.

The above policy can be formulated as follows:

$$\Lambda = \begin{cases} T' \rightarrow M / Nm \forall T' \in D(T) \\ O \rightarrow L \\ T' \rightarrow L(D(T)) \\ M \rightarrow a / d_r \forall r \in \sigma \end{cases}$$

The system can be implemented through a centralized security kernel, which decides on every system request. The module issues digitally signed tokens to access objects to ensure the integrity of the system.

# 5 Conclusions

In this article, we have described the necessity for developing automated assessment systems to raise the standards of education in an ODL environment. We reported different components that can help in building an effective automated assessment system for introductory programming assignments that involve C/C++ languages. Also, we identified some techniques and concepts that can help in making such system reusable with the capability of sharing its assessment objects in a secured manner. It is hope that this article will provide a good starting point for those who are interested in building such automated assessment systems in future.

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# 18

Online curriculum mapping as a learning analytic tool for collaborative distributed curriculum development: Implications for open and distance learning

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Abstract: This paper evaluates the acceptability of the open source online curriculum mapping system TODCM in distributed curriculum development. Adopting user evaluation and participant-observation, it evaluates the software using the criteria of support for collaboration and openness; the strengths and weaknesses of the curriculum mapping function; and usability and usefulness. The study looks at online curriculum mapping as a form of learning analytics for collecting instructional and curricular design data.

This study found positive perceptions of the CMS in terms of these criteria among geographically distributed graduate students and faculty members of a distance education institution. However, even though the software may support opening the curriculum design of DE programmes to learners, there is resistance to this idea from a majority of participants. In addition, the lack of integration of the CMS with a learning platform, such as a learning management system, is a critical weakness of the software in terms of being a learning analytic tool for helping teachers and support staff to develop interventions that support teaching and learning.

**Keywords:** distance education, open education, online curriculum mapping, participatory curriculum development for distance learning, learning analytics for open and distance e-learning planning

#### 1 Introduction

Distance education (DE) has made significant strides in openness in terms of access to instruction in recent years, but despite gains in open educational resources (OER) and massive open online courses (MOOCs), this openness confines choices for curricula designed by a select group of instructional designers, mostly from developed countries. Even if these resources are adapted by less developed countries in their DE programmes, there is a need to redesign them to match the countries' political, economic, social and cultural contexts. Participation by the stakeholders in the DE programmes is essential in this endeavour and thus the opening of the process of designing the DE curriculum itself should be discussed by DE practitioners.

There are different proposals for [opening] the design of the DE curriculum when different stakeholders are considered. The concept of an 'open curriculum' opens the curriculum design to learners. It can be implemented by allowing learners to draft their own learning plans, all made up of electives from any discipline in their institution, provided that the selected courses lead to a concentration in a particular field. The design of the learning plan is done with the help of a curriculum adviser.

MOOCs have extended this concept of the 'open curriculum' to any provider of instruction, even outside the DE institution, allowing the mixing of instructional resources, not just whole courses (Yuan & Powell, 2013). The original connectivist MOOC (cMOOC) not only allowed learners to develop private learning plans through their personal learning environments (PLEs), but let them create resources that may influence the negotiated spaces that serve as hubs of the network of instructional resources. In other words, the original cMOOC allowed learners to influence each other's learning plans in a network of overlapping PLEs. The learner is free to design his/her learning plan with MOOCs, but institutions have yet to accredit MOOC courses for the award of a degree.

Another proposal is 'participatory curriculum development' (PCD) that gives learners 'control over not only what is taught but how and where distance education takes place' (Guy, 1991, cited in McLean & Gasperini,

2002). The educator helps the learners to develop the emergent curriculum through collaborative investigation of critical themes in students' lives by following a structured process for developing context-specific curricula (Auerbach, 1990). PCD approaches are usually applied to non-formal lifelong learning programmes in developing countries.

A third proposal is 'online curriculum mapping', in which the primary stakeholders are teachers. Curriculum mapping is a 'calendar based planning process in which a teacher records the content and skills that are actually taught' (Jacobs, 2004, cited in Lucas, 2005). Curriculum mapping's central concept is the 'alignment' of learning content, activities and assessment to learning goals. Online curriculum mapping software allows teachers to collaborate on the design of curriculum. This paper explores this mediation of the process of curriculum design with technology that appears to parallel how online teaching and learning software mediates open and distance e-learning. Given a specific open source, curriculum mapping software called 'TODCM' (Curriculum Mapping System, http://todcm.org/index.php), is it possible to extend the openness of the curriculum design process of curriculum mapping beyond teachers to encompass the learners who are included in an open curriculum and PCD?

The current practice in the DE institution's faculty staff studied in this paper is what Auerbach (1990) calls 'the ends-means approach'. A committee of selected faculty staff drafts the curriculum proposals that 'identify a body of knowledge to be covered during a specific time period (ends), assess student needs, and provide a plan (means) for meeting predetermined objectives before instruction begins' (*ibid.*). The planning and review is usually done in face-to-face meetings supported by email with attachment of design documents. After the curriculum proposal is approved by the institution's policy–makers, it will take three to five years before the curriculum is evaluated and revised. Aside from the issue of openness, this practice raises the following concerns:

1 There is a lack of ownership of the curriculum proposal by faculty members who did not participate in the curriculum design process and rejection of curricular innovation.

- 2 Face-to-face workshops or meetings on curriculum development by representatives are costly, especially for teleworking distance educators (Taylor, 2004), and so the number of participants is kept small.
- 3 Design data are usually not recorded and only the final curriculum proposal survives the process. And because the document is not directly linked to the developed courses in the learning management system (LMS), analytics data are difficult to interpret without the lost design data (Ferguson, 2014). Analytics then becomes difficult to use for curriculum and programme revision.
- 4 There is further loss of curriculum design knowledge due to turnover of faculty members as a result of resignation or retirement. Because the younger faculty members who take over the programme were not part of the curriculum design, they fail to understand why certain decisions were made regarding that design.

This paper views online curriculum mapping as a learning analytic tool that collects data on curriculum design which in turn will be useful in making sense of related data collected in the implementation of the curriculum in learning platforms, such as a learning management system. A problem with learning analytic tools that rely on access logs — such as the traffic light MOODLE plug-in Engagement Analytics (Olley, Holman & Dawson, 2014) that alerts teachers about students at risk of dropping out — is that it can only say that students failed to access an activity or resource. But it cannot tell how that activity or resource was used by the teacher, what outcomes were expected and how the teacher can intervene by changing the activity or resource to help the student. This is the kind of intervention that learning analytics is supposed to support (Powell & MacNeill, 2012, p. 4). It is hoped that by combining curriculum mapping and learning analytics tools for learning platforms we will be able to acquire prospective and retrospective data on the instructional design process from design to evaluation.

The purpose of this study is to determine the acceptability of the open source software TODCM, an online curriculum mapping system (CMS), in curriculum planning among participants in a faculty of a DE institution who are geographically distributed. Will it support openness in curriculum design that implies affordances for collaboration among participants? In addition, it aims to find out if the facilities of the software provide the needed tools to align, and search for overlaps and repetitions, in the curriculum.

The study aims to answer the following questions:

- 1 What value do geographically distributed educators find in the online CMS in terms of its affordances for distributed collaboration and openness in curriculum design?
- 2 What is the perception of the geographically distributed educators on the strengths and weaknesses of the TODCM curriculum mapping software in terms of their curriculum mapping needs?
- 3 What is the perception of geographically distributed educators on the acceptability of the curriculum mapping system in terms of usability and usefulness?

The findings are intended to be used as a guide to customizing or supporting the existing curriculum mapping system with other learning analytic tools to develop the most effective way to use the tools in collaborative curriculum planning.

# 2 Relevant studies

A curriculum has been defined as 'the total structure of knowledge, skills, and educational experiences that make up any one educational system or its component parts', and curriculum planning is the systematic process intended to develop this structure (The Commonwealth of Learning & Asian Development Bank, 1999). In open and distance learning (ODL) curriculum planning is usually carried out by a development team.

Curriculum mapping has been used in curriculum planning since the 1970s (ASCD, 2001), but there seems to be a lack of schools in the Philippines using an online curriculum mapping system for distributed curriculum planning. Related to this issue is teacher empowerment in relation to curriculum development. (Carl, 2005, 2009). Teachers do not think curriculum development is part of their work. Some teachers consider the

curriculum guides as strict recipes that do not allow modification, even if they are aware of differences in the classroom and community context. If the teachers are part of a community involved in open design and development of the curriculum, there may be an opportunity to base the reforms on the rich experiences of classroom teachers and increase their sense of ownership of the curriculum and its innovations.

The presence of a persistent and open curriculum mapping system may also mitigate the loss of institutional knowledge due to the retirement of teachers. With paper-based curriculum mapping, the documents are usually lost or are stored and forgotten in archives. With online curriculum mapping, new staff will be able to access the work of the expert teachers who have already retired and learn from their design documents.

On the other hand, the participant-teachers/faculty may simply find the process tedious and an additional burden that does not add value to their work. In that case, the study may provide a basis for teaching education students and guiding other educators about the problems with curriculum mapping.

A dissertation by Ralph Michael Lucas (2005) found that teachers perceived the mapping process 'to be particularly effective for the alignment of curriculum and long range planning and slightly less useful for short range planning'. But, in general, he stated that 'curriculum mapping is an efficient and effective tool to plan for instruction and to align the taught and written curriculum with required assessments'.

Case studies on the use of curriculum mapping systems for K-12 education have been documented in the work of Heidi Hayes Jacobs (2004) and Jacobs and Johnson (2009). For higher education, the study by Kay Pippin Uchiyama and Jean Radin (2008) found that 'curriculum mapping provided a method to not only align and articulate the curriculum, but also a way to foster collaboration and collegiality of those participating in the process. The interaction among participants ... promoted collaboration and collegiality, allowing the participants to share knowledge and beliefs about teaching and learning'.

Alignment is a central idea in curriculum mapping. In instructional design, this is usually referred to as a 'congruence' of learning objectives with

activities and assessment. Related to this study is David Jones' proposed alignment project that would integrate curriculum mapping in an LMS (Jones, 2010), using John Biggs' (1996) concept of 'constructive alignment'. However this paper does not incorporate constructive alignment in its conceptual framework.

The research framework of this study is shown in Figure 1.



Figure 1 Research framework

# 2 Methodology

An instance of the TODCM software was installed online and used to teach graduate students in three Social Studies Education courses from 2012 to 2013 in a full e-learning mode in a programme of a faculty of the DE institution. Two faculty members, including the researcher, and 15 graduate students participated in the first phase of online curriculum mapping. The participants were distributed across the Philippines and outside the country.

# K-12 CMS



Figure 2 Front page of TODCM

Throughout this period, a total of 22 course proposals with 67 units were produced in the first phase. The first class project that asked students to create an integrated curriculum for K-12 produced ten course proposals with 19 units on economics and politics. The second class project had 11 self-contained course proposals with 25 units on K-12 geography and history. The third class project was a single course proposal on 'Asian migration during the Cold War era' with 23 units. A course here refers to study for one academic year, while a unit lasts for a few months of the academic year. Only sample units were produced for each course proposal and not for the entire year.

In the second phase, five programme chairs from different programmes of the faculty (technically equivalent to a College) were given a 2-hour workshop in 2015 and allowed to work on two of their programme's courses and practice using the software curriculum mapping tools.

It must be noted that the programme in the first phase had a small enrolment that averaged 15 students per semester; and that the entire faculty had at the time of this study seven programme chairs who were responsible for administering and evaluating the curriculum. The programme chairs were also involved in designing the curriculum proposals and, like the students, they were also distributed in nearby provinces that are about three to four hours away from the main campus of the DE institution.

Participants were then invited to evaluate the online curriculum mapping software by answering an anonymous online survey that was repurposed as an evaluation sheet containing Likert items. Informed consent was solicited via email and on the first page of the online evaluation sheet. Of the 21 participants, excluding the researcher, 12 (57.14%) evaluated the software.

Although the number of respondents is small, the focus is on their insights into the design of an online curriculum mapping system rather than the generalizability of their perceptions to other curriculum planners. This perspective is adapted from the literature on the acceptability of small sample sizes in **usability** studies (Nielsen & Landauer, 1993; Turner, Lewis, & Nielsen, 2006). The primary focus is to redesign the curriculum mapping system so as to present a curriculum mapping software that meets the needs of distance education curriculum planners in future iterations of the study.

The percentage frequencies of their response were generated from the survey data to determine agreement about the pre-specified criteria for evaluating the software. The findings were then compared to the notes of the researcher as a participant observer in the curriculum mapping projects.

# 3 Findings

The results of the survey on the perceptions of the educator participants on the online CMS are presented in the following sub-sections.

# 3.1 Collaboration

Of the evaluators, 91.67% agreed that the software supports collaboration at a distance by allowing teachers to copy and modify other teachers' unit plans; 83.33% said it affords collaborative editing of course plans and units;
and 75% agreed that, when they discuss curriculum plans, they can refer to the CMS as a shared document. For example, participants can simply point to a link to the CMS unit plan rather than sending each other PDF copies of the plan, thereby ensuring that they are looking at the same version of the document.

#### 3.2 Openness



Figure 3 Perceptions of support for openness of online CMS plans

Figure 3 shows that 75% of the participants believed that the plans should be viewable by all teachers, and 8.33% disagreed; 41.67% thought it should be accessible to external reviewers, while 16.67% disagreed; and 50% said it should be viewable by students, but 33.33% disagree. Moreover, 75% disagreed that the plans should be editable by students and only 8.33% agreed; and 83.33% disagreed that it should be editable by the public like a wiki.

#### 3.3 Curriculum mapping functions

All the participants thought the software supports the basic curriculum mapping tasks, such as identifying the preferences of teachers for activity and assessment types, and aligning learning targets **with** standards. In addition, they felt it was useful for aligning learning activities and assessment methods **to** standards (91.67%); helped identify repeated activity, content, unused activity types and overlaps in content taught

(83.33%); and helped to identify overlaps in learning targets (91.67%), but 8.33% disagree.

#### 3.4 Usability

Participants found it easy to add and delete units in the CMS (83.33%); and 91.67% said it was easy to edit units, while only 8.33% disagreed. They also considered it easy to find data on overlaps and repetitions (83.33%); and most found it easy to find data on curriculum gaps, and share units with other teachers (66.67%); and 58.33% thought it was easy to interpret the results of mapping.

Half the participants disagreed that using the curriculum mapping system is difficult, while 16.67% agreed; and 33.33% disagree that its navigation is confusing, while 25% found it confusing.

#### 3.5 Usefulness

Over 90% (91.67%) said implementing an online CMS will benefit teachers; 83.33% said it will benefit administrators; and 83.33% also thought it would allow reflection about the plans, and would help retiring teachers to pass on their expertise to new teachers. While 83.33% would recommend its use to other teachers, 8.33% would not. The same percentage (83.33%) also thought it would help to improve a programme, curriculum, and unit or lesson plan/module, while 8.33% disagreed that it would improve a lesson plan/module and 16.67% thought it would not improve a programme, curriculum or unit. While 83.33% planned to use the CMS after their participation in the study, 16.67% will not. Also, 75% would not. In addition, 75% thought the CMS would benefit students, while 16.67% did not.

In addition, 75% disagreed that using the CMS is merely a 'fillingin-the-boxes' activity that adds more work without any benefit; and most disagreed that the functions of the CMS can be duplicated with a spreadsheet (58.33%, but 8.33% **agreed**), post-it notes (58.33%, but 8.33% **agreed**), and paper and pencil (58.33%, but 16.67% still preferred this approach).

#### 4 Discussion

It is acknowledge that the small number of participants (12) limits the generalizability of the perceptions to the sample's programme. However, it is argued that the coverage of tasks and the amount of time working on curriculum mapping with the software allowed the first-phase participants to provide valuable insights on the online curriculum mapping system and its potential use in curriculum and programme planning in distance education, while the programme chairs in the second phase of the study brought their expertise in curriculum development for open and distance learning. Future research focusing on participants adopting an improved design of the online curriculum mapping system will remedy this with a larger sample size and covering other programmes.

Most respondents believed that the online CMS supported the basic curriculum mapping needs of alignment, identification of gaps, and identification of repetitions and duplications in the curriculum.

Many respondents found the online CMS easy to use, but there were still many who found its navigation system confusing. The respondents thought that the CMS would benefit teachers, administrators and students; and they intended to use it and recommend it to their schools.

A weakness of the online CMS is that it is not integrated with a learning platform, such as an LMS. This was originally intended by the developer but was abandoned for personal reasons (Tong, 2013). The problem with a stand-alone CMS is that it is difficult to align the outcomes and other design plans with the actual implementation of the plans in the learning platform. TODCM's smallest unit of analysis is the curriculum unit. Outcomes or standards are listed in the stage one section of the unit plan, the assessment in the next stage, and then the activities, and so on. But there is no facility within the unit plan to link specific assessment or activities to specific outcomes or standards. The data from such a system will be difficult to match with a distance education institution's LMS or MOOC platform data. Even if data matching is possible, it will be costly.

An alternative to this stand-alone CMS is what David Jones proposed in his alignment project proposal (Jones, 2010). He proposed to equip the MOODLE LMS with a curriculum mapping facilities based on the MOODLE's outcomes system. However, Jones' proposal was also abandoned for personal reasons (Jones, 2011).

It is recommended that future researchers continue Jones's study of curriculum mapping in his blog. Of particular note is his deepening of understanding of variations in the theory of alignment (e.g. instructional alignment versus constructive alignment).

Also, it is proposed that distance education institutions adopting learning analytics should consider collecting design data as annotations in the course sites, or personal learning environments (PLEs) of students. Such a facility could aggregate the annotations into design documents inside an LMS, or even outside as a learning design aggregator, and be used to make sense of students' engagement data with the LMS or PLE.

The openness of the curriculum and the production of the curriculum in open and distance learning allows collaboration and critical examination of the curriculum that in turn leads to higher quality instructional materials (Lentell, 2006). But there is a difference between the openness that allows the public to judge the curriculum as a product and the openness that allows the public to participate in the 'production' of the curriculum. In the case of the CMS, most of the participants agreed that it allowed sharing, copying, and collaborative editing of course and unit plans. Many respondents agreed to open the CMS plans for viewing, but there was strong opposition to the plans being made editable by students and the general public. This belief is contradictory to the openness espoused by the 'open curriculum' and PCD.

Furthermore, collaboration cannot be done with TODCM alone as it lacks a messaging facility. Online discussion about the plans, especially critiques of standards or outcomes, can only be done outside the CMS. Without criticism, the curriculum in ODL institutions tends to be rigid and lags behind changes in their domains of study. A CMS with collaborative facilities may support shorter review cycles and thus lead to flexible curricula (Trindade, Carmo & Bidarra, 2000) and continuous curriculum planning. A characteristic of distance learning is central curriculum development, but central planners may 'minimize teachers' participation in the process or neglect to cultivate the ownership of changes, involving them too little or too late' (Robinson & Latchem, 2003). ODL approaches are proposed as a strategy for curriculum reform and change management (*ibid.*), but the focus is on training teachers on curricula that have been developed without their participation. This paper offers another view of applying ODL to curriculum development — that is, the adoption of the management infrastructure and system used by ODL in opening the curriculum production process. This perspective may not only prove relevant to teleworking educators in a distance learning institution, but also with co-curriculum development among regionally and globally distributed distance learning institutions collaborating to produce common high-quality curricula.

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# Online tutorials for the Economics Education course: Their effectiveness in improving student mastery

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Abstract: This study was conducted to identify the barriers to student participation in online tutorials (tuton) for the Final Project (FP) course in the Economics Education study programme, and to evaluate the relationship between students' activities in the FP course tuton and student mastery of the materials. The results from this research are expected to enrich learning theory, especially with regard to the provision of learning support in a distance education system. The subjects in this project were 38 out of 41 students registered in the FP course's tuton in the first semester of 2013, and it used document and a survey. In general, the factors that support students' engagement in the FP course's tutorials - known as a 'tuton' - are ease of access to, and familiarity with, computers and the Internet, understanding the benefits of technology in the learning process, and ability and willingness to implement self-study. The respondents noted barriers associated with their limited activities in the FP course's online tutorials which included limited access to the Internet, a low perception of the roles of the media in the learning process, and limited time, as well as limited ability to operate computers and the Internet. Statistically, only the quality of the assignments uploaded had a relatively high correlation with students' final scores (P=0.76), with other correlations falling below 0.50 in Pearson's correlation coefficient. Based on these findings, it is recommended that: some discussions should be replaced with an assignment; easy access to computers and the Internet should be provided; and students familiarized with their use; online tutorials should be enhanced with relevant materials from the modules: and there should be increased congruency between the topics discussed and materials in the modules.

**Keywords:** distance education, Economics Education study programme, learning support, online tutorial, Universitas Terbuka

## 1 Intoduction

The students' learning outcomes for the Final Project (FP) course in the Economic Education Study Programme (EEP) at Universitas Terbuka (UT) are relatively poor as reflected in their low GPA, which was just enough to meet the minimum requirement to graduate (UT, 2014). With such a low GPA, one can hardly expect them to be very competent in promoting learning as teachers.

As a distance education institution, UT uses media to facilitate the learning process. Printed learning modules are used as the primary means to deliver learning; and, to improve the quality of the learning process, since the first semester of 2010, UT has provided online tutorials. Online learning as a method for facilitating student mastery has now gained prominence - as much as a third of all the students enrolled in post-secondary education in the United States in 2011 took an accredited online course (Lederman, 2013). Courses which combine face-to-face and online learning are commonly known as hybrid (Tabor, 2007) or blended (Vaughan, 2010) courses. There are many ways to utilize online learning, as Bergmann and Sams (2012) stated, such as posting videos online so that, as students move through the content, they are able to do so at their own pace. This is implemented in the Flipped-Mastery model that uses technology to timeshift the individual instruction (Bergmann & Sams, 2012). Furthermore, Asfaranjan, et al. (2013) argue that the use of an Internet forum, an online discussion group, and an online learning community contribute to effective distance education; and they also stated that socialization plays the most vital role in effective distance education. In addition, Orr (2010) believed that distance education using web-based technology such as Skype could serve to meet the need of music therapists living in rural areas to continue developing, learning, and attaining advanced clinical skills.

Tutons at UT are expected to improve the quality of student learning, and one tuton is provided for the FP course. Students eligible for the FP course are those who have completed the minimum of course credits (19), with a GPA of at least 2. The tuton takes eight weeks to complete. Data have shown that the majority of the students (69%) logged in less than 17 days during the tuton period, reflecting that, on average, they logged in two days per week. During log in, students are expected to download initiation materials to be learned and mastered, as well as post comments on the discussion forums on the topics that have been prepared by tutors. These discussions replace the face-to-face interaction between students and between them and their tutors.



Figure 1 Distribution of respondents based on their total log in in EEP tuton (N=41)

Active engagement in the tuton is expected to enhance student performance because it, for example, is flexible, less expensive than attending face-to-face learning, and easy for tutors to update and revise the material (Hopey & Ginsburg, 1996; Kilian, 1997; Owston, 1997). Nevertheless, online learning also has constraints deriving from situation, epistemology, psychology, pedagogy, technical, and cultural aspects (Garland, 1993; Galusha, 1998; Kaye & Rumble, 1991; Lewis & Romiszowski, 1996; Sherritt, 1992; Sherry, 1996; Shklanaka, 1990). Details of each of these aspects are elaborated in Table 1. The constraints in online learning can result from only one or a combination of several aspects.

Aspects	Constraints
Situation	• Limitation of formal agreement on the programme
Epistemology	• Non-educational issues take over from educational issues
Psychology	• Faceless learning
Pedagogy	• Inadequate ability for self-directed learning
Technical	<ul> <li>Lack of time to implement online courses</li> <li>Lack of learning resources (including the library)</li> <li>The high cost of developing learning materials</li> <li>The absence of a national policy, funding priorities, and policy leadership</li> <li>The more advanced the technology used, the greater the likelihood of errors</li> <li>Lack of technology assistance</li> <li>Time needed to implement online learning</li> </ul>
Cultural	<ul> <li>Concerns about the shifting role from teaching to computers</li> <li>A shifting in traditional values attached to the process of obtaining degrees</li> <li>Instructors' culture</li> <li>Resistance to change</li> </ul>

#### Table 1 Constraints in online learning

Being aware of the existence of these constraints and the obstacles students may face during their tuton activities, UT has included certain approaches to make sure that students can get the full benefit from the tuton. These approaches include providing initiation materials, either from the modules and/or aditional materials which can enrich their reading; discussions where they are given opportunities to analyse certain topics; and assignments to assessed their mastery of the learning materials.

Students registered in the FP course are automatically registered in the FP course's tuton, which can be accessed through the UT website (www. ut.ac.id). The students have to activate their tuton account where they will be given a user name and password (see Figure 2), and only then

can they engage in the tuton. To make sure that students can maximize their interaction, they are asked to read 'Online Tutorial Guidance for Students' which consists of explanations about the tuton, such as the roles of students and tutors, activities, duration and deadlines in the online tutorials (see Figure 3). Tutorial sessions to familiarize students with the system used in the online tutorial are also provided.



Figure 2 Student activate their account on this page



Figure 3 Students are asked to read the tutorial guidance on this page

This research analyses the relationship between EEP students' activities in the tuton and their level of mastery in the FP course in the first semester of 2013. Students engagement involved analysing their activities in terms of their frequency of opening the initiation materials, the frequency and quality of discussion, and the frequency and quality of the assignments uploaded in the FP final scores for the course, measure students' mastery of the course.

Data were collected by sending a questionnaire via e-mail and mail to all students participating in the 2013 tuton in the FP course. The first round of emails was sent in April-May 2013 to all 41 registered students, with 12 returning the completed questionnaire. A second round of emails was sent to the 29 students who had not returned the questionnaires in the first round, which resulted in six student returns. Finally, the questionnaire was sent to the home addresses of the remaing 23 students, and 20 completed it. Therefore, there were 38 respondents in this research, 79% women and 21% men. More than one-third (38%) of the respondents were between 25 - 44 years old.

# 2 Findings and discussions

#### 2.1 Factors affecting student registration on the FP course

It is argued by technology experts that some of the factors that favour the utilization of educational media are its availability, flexibility, ease of use, and its relative cheapness compared with face-to-face learning (Hopey & Ginsbur, 1996; Kilian, 1997; Owston, 1997). Most respondents agreed with some of these points but, contrary to what the experts say, some respondents viewed access to computers and the Internet as constraints on their learning. They agreed that computers and the Internet could be beneficial for the learning process, but they found it hard to take advantage of this because they had difficulty in accessing them. This reaction could be rooted in the relatively low Internet penetration, with only 15% of the Indonesia population having access to it (Millward, 2014).

Almost all (96%) the respondents who were teachers in secondary schools had been familiar with the Internet for more than five years; and as much as 85% of the respondents said they needed the Internet to facilitate their work. More specifically, 96% of the respondents stated that they used the Internet to search for news, but only 25% of them used it to browse for learning material

that could be used to enrich the teaching materials in their classrooms. Also, only 4% of the respondents were aware that they can utilize the Internet for learning resources for their study at UT. The fact that 96% of the respondents used the Internet to browse for news, but only 4% of them used it as a learning resources for their studies at UT, should be adopted as an entry point to familiarize students with websites related to the course contents.

The reasons for respondents registering in the FP course are (1) the requirement to complete their studies (93%); (2) using technology for learning enhancement (36%); (3) an opportunity to enrich their knowledge and skills (29%); and (4) an opportunity to discuss topics related to the course (12%). In order to graduate from the EEP, student have to pass the FP course. Therefore, it is understandable that almost all of the respondents stated that they registered in the FP course in order to fulfil the graduation requirements. Meanwhile, more than one-third of themstated that they registered for the FP course because they wanted to experience using technology (in this case, the Internet) in the learning process. They knew the consequence of using the technology (familiarity with computers and the Internet.) The majority of the respondents (92%) had been using computers for more than six years and none of them mentioned inconvenience in using computers or the Internet. It was felt that this situation could be exploited to optimize the utilization of the FP course's tuton, as Galusha (1998) found that one of the obstacles earners faced in utilizing online learning was convenience in using a computer or the Internet. In this regard, some of the respondents mentioned that UT should provide training in operating computer and utilizing the Internet.

The need to meet and discuss learning materials with other students and tutors, as expressed by 12% of the respondents, is facilitated by a discussion forum in the tuton. However, on average, only 8% of the registered students posted message on the discussion forum each week. Moreover, there was no discussion posted in weeks 3 and 5. This research does not question the reasons for low students' engagement but there are several possible factors which explain this contradiction, such as the topics being too difficult, or lack of time to engage in discussion because assignments were due in weeks 3 and 5. Unrelated topics can be waived as a reason since more than 80% of the respondents spoke highly of the quality of the topics discussed (Table 2).

#### 2.2 Perception of various aspects of the tuton

In general, respondents had a good perception of various aspects of the tuton namely tutor responses and the quality of the initiation materials - although some recommended for improvements were made (Table 2). As regards the benefits, almost 90% of the respondents stated that they gained from the initiation materials, discussions, and assignments. However, they mentioned the importance of focusing on learning materials that would be tested - they did not feel the need for additional materials for broadening their insights. These findings should encourage tutors to prepare learning materials in line with the course and evaluation blueprints.

Aspects	Good	Fair	Bad	NA
A. Benefit in mastering the learning materials				
Initiation materials	89	-	-	11
Discussions	86	-	-	14
Assignments	96	4		
B. Tutors' responses				
Correctness in answering students'	86	10	4	-
questions/inquiries				
<ul> <li>Promptness in answering students'</li> </ul>	86	14	-	-
questions/inquiries				
Clarity in answering students' questions	79	13	4	4
• Activities in discussion forum	71	25	-	4
C. Initiation materials; topics for discussions				
Congruence	96	4	-	-
• Depth	93	7	-	-
Pertinence	93	7	-	_
Comprehensiveness	86	14	-	_
D. Improvements recommended				
• Enrichment in topics of discussions	92	4	4	_
• Enrichment in initiation materials	86	14	-	-

Table 2 Respondents' perception of aspects of the tuton (N=38)

The respondents also had high perceptions of tutor responses, except in one aspect - tutor activities in the discussion forum. However, this could not be blamed solely on tutors, since, as noted earlier, the data showed that on average only 8% of students engaged in the tuton weekly, and this small number of posting could limit tutor comments, leading to a 'chicken-andegg' situation. Nonetheless, because of the impotance of the discussions in the learning process, UT has to encourage students, and tutors, to be more active in discussion. This is in line with Quitadamo and Brown's (2001) view that discussion can create greater student motivation and excitement for learning. Tutors could develop authentic situations and scenarios as a stimulus for learning, representing and simulating real-world problems and concepts which they believed can provide an important structure for student thinking. Also, they could emphazise authentic tasks in context rather than abstract out-of-context activities to create a greater likelihood of student learning (Driscoll & Carliner, 2005). The University must make tutors more aware of students' need for engagement and activities that enable them to analyse, synthesize and evaluate information while constructing knowledge (Driscoll & Carliner, 2005).

This should not be difficult to achieve since the respondents had very positive perceptions of both the quality of the initiation materials and the topics for dicussion, although at the same time 92% of them said the discussion topics needed enrichment, 12% expressed their needs for discussion facilities, and only 8% engaged in discussions in a week. Based on these findings, UT must evaluate the topics for discussion and how the tutors motivate students to actively participate in discussion. Nevertheless, for success in the tuton, students need to exercise their writing skills, be self-motivated, and make a time commitment to learning, as noted by Golladay, Prybutok, and Huff (2000) and Serwatka (2003).

Meanwhile, as detailed in Table 3, respondents seemed to be sharply divided in term of their familiarity with, and access to, computers and the Internet. On the one hand, some students stated that they had easy access to computers and the Internet, and were familiar with using them; but others mentioned their difficulties and limitations in gaining access to and using them. Therefore, computers and the Internet served as both supporting and inhibiting factors for students' paticipation in tutorials. UT has to bridge this gap by providing training for students who are not yet familiar with computers and the Internet. At the same time, the University could work with Internet kiosks to provide access. However, none of the respondents said anything about isolation (Brown, 1996) or frustation, anxiety, and confusion (Hara & Kling, 2000; Piccoli, Ahmad, & Ives, 2001) which are commonly identified as potential problems for e-learners.

Aspects*	Supporting factors	Inhibiting factors		
Situation	<ul> <li>High access to the Internet</li> <li>Familiarity with computers</li> <li>Familiarity with the Internet</li> </ul>	<ul> <li>Low access to the Internet</li> <li>Unfamiliarity with computer</li> </ul>		
• Epistemology	• Useful in the learning process			
Philosophy	• Media as a tool	• Media cannot replace the lecturer		
• Pedagogy	• Willingness to self-study	• Inability to manage the learning process		
• Technical	• Relatively low-cost to learn	<ul> <li>Time limitation</li> <li>Limitations on ability to operate a computer</li> <li>Limited access</li> <li>Poor quality of the network</li> </ul>		
• Cultural	<ul><li>Familiarity with computers in daily chores</li><li>Familiarity with the Internet in daily chores</li></ul>	• Not familiar with the Internet		

 Table 3
 Factors supporting and inhibiting respondents' activities in FC tutorials (N=38)

\* The aspects and indicators are derived from Garland (1993); Galusha (1998); Kaye & Rumble, (1991); Lewis & Romiszowski (1996); Sherritt (1992); and Sherry (1996).

# 2.3 Correlations between activities in the tuton and final scores

There was a weak correlation (0.44) between the frequency and quality in discussions with the final examination scores. This finding contradicts studies showing that student's active involvement in the learning process enhances their learning (Benek-Rivera & Mathews, 2004; Sarason & Banbury, 2004). This could be due, in part, to the limited interaction between students, and students and tutors, as reflected in the low number of discussions. This finding also contradicted the results of Picciano (2002) and Watkins (2005) who found that interactive instruction resulted in positive learning outcomes. Actually, as Johston, Killion and Oomen (2005) showed that online coursework has the potential to create environments where students actively engage with materials and learn by doing, defining their understanding as they build new terchnology. However, the institution has to prepare the facilities so that the potential becomes reality.

The 0.76 Pearson correlation between the quality of assignments uploaded and the final scores showed that students who excel in assignments have a strong potential for getting high score in the final examination. As it seems that these students have enough reading material and exercises to do their assignments, they did not have any difficulty in scoring well in the final examination. However, the frequency of opening the initiation materials had a low correlation with the final examination score (0.47). It was expected that the more that students opened the materials, the higher their scores would be in the examination as this would expose them to more learning materials, but this did not prove to be the case. In addition, the correlations between the number of materials looked and the number and quality of discussion engaged in were low at 0.47 and 0.44 respectively.

## 3 Conclusion

The tutorial activity with the highest correlation with the students' final scores was the quality of the assignments uploaded (correlation = 0.76). Meanwhile, the correlation between the number of initiation materials looked at, and the number and quality of discussions engaged in, were only

0.47 and 0.44 respectively. Based on these results, it is recommended that some discussions should be replaced by an assignment, as students tend to be more serious in doing their assignments than engaging in discussion. Specifically, it is suggested that, instead of having eight sessions/topics for discussions and three assignments, it is suggested that there should be six discussions and four assignments

Based on respondents' assessment of the activities in the tuton of the FP course, it is proposed that UT should provide students with easy access to computers and the Internet by, for example, cooperating with Internet kiosks. It is also recommended that training should be conducted for students to become familiar with computers and the Internet. Finally, it is suggested that, to enhance the benefits for students of the tuton in the FP course, it is proposed that the EEP Study Programme should make sure that the material used in the tuton relate to the modules, to ensure greater congruence beween the topics discussed and the module content. For this purpose, workshops could be conducted with tutors, in which they are informed about the importance of revising the initiation materials and topics for discussion.

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# Students' satisfaction and perceived attainment in the use of an online discussion forum: A follow-up study in the OUHK

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Abstract: The Open University of Hong Kong (OUHK) has integrated online learning components into its distance learning programmes since 1998, and an online discussion forum is one of the major channels for communication between students and their tutors. However, a number of internal studies have shown that the participation rates of both students and tutors in the discussion forum are far from satisfactory (e.g. Choi, 2006, 2007; Tsang, Choi & Tam, 2002).

In order to promote the use of this online discussion tool, an online training course is offered to newly appointed tutors in the University. However, a study designed to investigate the engagement of tutors in the discussion forum found that, after completing the training course, tutors did not participate more actively (Choi, 2013). The present study aims to further examine, from the students' perspective, the effectiveness of the discussion forum in the OUHK after all the promotional efforts. The theoretical framework adopted in the study is the Community of Inquiry model, which argues that learning occurs within an online community through the interaction of social, cognitive and teaching presences (Garrison, 2011). In an online survey in the University, students' level of satisfaction, perceived attainment, and the three presences perceived are examined and compared with those in an earlier study in the OUHK (Choi, 2007).

The data collected show that the cognitive presence, social presence, student satisfaction and perceived attainment in the discussion forum are all significantly lower than before. This unexpected phenomenon is then examined and recommendations to enhance the use of the discussion forum are proposed.

**Keywords:** distance education, asynchronous online discussion, community of inquiry

# 1 Introduction

The advances in computer technologies and the popularity of the Internet have already changed the way distance education is delivered. In traditional correspondence courses, interaction between students and their teachers is very limited. With the aid of various types of computer-mediated communication (CMC) tools, distant learners can now communicate with their teachers and fellow students anytime and anywhere. Communication tools, such as e-mails, real-time chat-rooms, and asynchronous discussion forums, are widely used and the constraints of geographical separation have been greatly reduced. In recognizing the impact of this new communication technology, CMC has been acknowledged as the tool leading to a new generation of distance education (Garrison, 1997; Moore & Kearsley, 1996).

Among the CMC tools, a text-based asynchronous discussion forum is highly recommended by most researchers in the field of distance and online education (e.g. Garrison, 2011; Hew & Cheung, 2012). They argue that the online discussion forum can effectively promote critical thinking among learners, and critical thinking is often recognized to be at the heart of higher education (Laurillard, 1993; Stassen, Herrington & Henderson, 2011).

In fact, an online discussion forum has been widely adopted in both distance courses and face-to-face classrooms (Hew, Cheung & Ng, 2010). It is generally believed that, with the aid of this online communication channel, knowledge can be critically constructed, validated and shared among learners and their teachers (Hew & Cheung, 2011).

# 2 Theoretical framework

In this study, the theoretical framework adopted is the Community of Inquiry (CoI) model first suggested by Garrison, Anderson and Archer (2000).

The notion of a 'community of inquiry' originated with Lipman (1991), who refers to it as an essential context to facilitate critical thinking and deep learning. In examining the teaching and learning through an online asynchronous, text-based discussion forum, Garrison, Anderson and Archer (2000, 2001) argue that a 'community of inquiry' is extremely valuable for higher-order thinking. In such an online community, learners construct and reconstruct experience and knowledge through critical analysis of subject-matter, questioning and challenging of assumptions. In the mediated communication setting, social interaction, cognitive thinking and teaching support can then be reflected by social, cognitive and teaching presences in the CoI model, and learning occurs within the community through the interaction of these three presences (Garrison *et al.*, 2000, 2001; Garrison, 2011), as shown in Figure1.



Figure 1 Community of Inquiry (from Garrison et al. 2000, p. 88)

**Cognitive presence** is 'the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication' (Garrison *et al.*, 2000, p. 89). **Social presence** is defined as 'the ability of participants in the community of inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as "real people"' (*ibid.*). **Teaching presence** consists of two general functions, which are performed mainly by teachers. The first function is the 'design of educational experience', which includes the 'selection, organization, and primary presentation of course content', and 'the design and development of learning activities and assessment.' The second function is 'facilitation'. Teaching presence for the purpose of realizing educational outcomes' (*ibid.*, p. 90).

Garrison (2011) argues that, in a community of inquiry, learners learn through constructing knowledge by collaborative discussion. Garrison and Archer (2000) refer it as a 'collaborative constructivist perspective' on teaching and learning transaction, and they regard educational experience as a collaborative communication process for the purpose of constructing meaningful knowledge. The underlying assumption of this theoretical perspective is that knowledge is motivated, organized and communicated in the context of social interaction. Based on this theory, the pedagogical value of a discussion forum in supporting higher-order educational objectives will depend on its ability to facilitate open communication and reflective discourse. A number of studies have been conducted to validate the model, such as Morris (2011), Joo, Lim and Kim (2011), Lambert and Fisher (2013), to name but a few. An empirical study in the OUHK also confirms that the cognitive presence, social presence and teaching presence are contributing factors to students' satisfaction with the use of a discussion forum and their perceived attainment (Choi, 2007).

## 3 Use of discussion forum in the OUHK

The Open University of Hong Kong has integrated online learning components into its distance learning programmes since 1998, and the 'discussion board', an online asynchronous discussion forum, is one of the

major channels of communication between students and their tutors, apart from the regular face-to-face tutorials.

When the OUHK recruited its first cohort of students in 1989, teaching and learning were conducted via print-based learning materials and regular face-to-face tutorials. After the incorporation of online learning support in 1998, the provision of learning materials and face-to-face tutorials nevertheless remained unchanged. Face-to-face tutorials and the online forum are not compulsory in most of the courses in the OUHK, and this policy provides the greatest learning support as well as flexibility to students. The provision of an online discussion forum is expected to further enhance teacher-student interaction, and offer better support to those students who cannot attend face-to-face tutorials.

However, a number of internal studies have revealed that students in the University are not very enthusiastic about the use of the discussion board and the participation rates of both students and tutors in the discussion board are far from satisfactory (e.g. Choi, 2006, 2007; Choi & Tsang, 2001; Tsang, Choi & Tam, 2002). In a study investigating students' participation in the discussion board, it was shown that each student had posted less than four messages ( $\bar{x} = 3.88$ ) in the discussion board after six months of study (Choi, 2007). An earlier OUHK-based study had been conducted to investigate the possible factors affecting the participation rate in online communication. This study showed that the number of postings by tutor is significantly correlated to students' logins (r = 0.762, p < 0.001) and number of postings (r = 0.782, p < 0.001) (Tsang *et al.*, 2002).

Another OUHK study found that students do not have a strong sense of presences of the CoI model. In a 5-point summative scale to indicate the various presences, the mean scores on cognitive, social and teaching presences were 2.92, 2.70 and 2.69 respectively (Choi, 2007). The same study showed that students are also expecting support from their tutors via the discussion board, but tutors' participation in the tool was disappointing. Students are not motivated to engage in online communication when they find that their tutors are absent (Choi, 2007). In fact, the factors affecting students' participation in the discussion forum have been widely explored, and tutors' engagement is always one of the major factors (e.g. Tsang *et al.*, 2002; Volery and Lord, 2000). In order to better utilize the discussion forum as a supporting tool, the OUHK has conducted several training sessions for tutors and course coordinators. In addition, a short online course — Online Tutor Training (OTT) — has been offered regularly since 2003, in order to equip newly appointed tutors with basic knowledge and skills for conducting online tutorials via the discussion board. Course evaluation surveys showed that tutors are generally satisfied with the short course and find it useful. For example, in the course evaluation in the second semester of 2012, 71% of the respondents said they were 'satisfied' or 'very satisfied' with the OTT course, and 86% of them claimed that they would 'definitely' or 'be very likely' to adopt what they had learned in their own tutorial (Educational Technology and Publishing Unit, OUHK, 2012).

However, a study specially designed to examine the engagement of tutors who had completed the OTT course from 2008 to 2013 found that their actual participation in the discussion board had not improved. Over 30% of the respondents logged in to the discussion board zero to four times in an average month, i.e. only once a week or less; and another 39.7% logged in 4.1 to eight times a month (Choi, 2013). Therefore, almost 70% of the respondents are non-active users of the discussion forum, and they engage in the communication channel less than twice a week. The same study found that 29.4% of the respondents had never triggered a dialogue (or discussion) in the discussion board, which means that they just, if ever, passively used it to answer students' questions. Another 32.4% of respondents posted one triggering message or less in a month on average. Therefore, over 60% of the respondents were not actively using the discussion board as a tutorial tool (Choi, 2013). In the same study, correlation analysis reflected that tutors' attitude towards the use of the discussion forum was not significantly correlated with the number of messages posted — that is, though many tutors believe that the communication tool is useful, they just did not use it.

## 4 Research questions and methodology

The purpose of the present study is to investigate the effectiveness of the use of the discussion forum in the OUHK in 2014, in terms of the three presences in the CoI model, as well as students' satisfaction and their

perceived attainment. The results will then be compared with a similar study in the University (Choi, 2007), to see if there is any improvement after years of OTT training for tutors.

#### 4.1 Research questions

The three research questions are as follows:

- 1 Are there any differences between the OUHK students in 2007 and 2014 in terms of their perceived cognitive presence, social presence, and teaching presence in the discussion board?
- 2 Are there any differences between the OUHK students in 2007 and 2014 in terms of their satisfaction and their perceived attainment in the use of the discussion board?
- 3 Are students' satisfaction and perceived attainment in the use of the discussion forum related to their perception of the various presences of the CoI model?

#### 4.2 Design of questionnaire and data analysis

To answer the first question, an online survey was conducted to measure the various presences of the CoI model in the discussion board. The 'presences' reviewed by the questionnaire are those perceived by the respondents, after some participation in the discussion board in their distance learning courses. Students' satisfaction towards and perceived attainment through the online forum were also measured; and the outcome was then compared with the results in Choi (2007) by an independentsamples t-test. The relationship between students' satisfaction, perceived attainment and the three elements of the CoI model was measured by the Pearson product-moment correlation coefficient. The questionnaire in the present study was basically the same as the one used in Choi (2007). Summative scales of each of the three presences were derived from their various indicators in Garrison (2011). Cronbach's alpha coefficients of the three scales were all higher than 0.9, and the internal consistency of the scales was satisfactory. The scales of satisfaction and perceived attainment were also validated (Choi, 2007).

In order to explore the reason behind the low participation of the OUHK students, an open-ended question at the end of the online questionnaire was used, which simply asked respondents to give their opinion on the use of the discussion board, and this provided a non-directive prompt for students to express their attitude and views freely on the use of this communicative tool. The responses were analysed through a qualitative approach, the focus being on students' opinions on the use of the online forum as a learning support.

#### 4.3 Sample

The subjects in the present study were all undergraduate or postgraduate students in the OUHK. A total of 45 courses from the four Schools — the School of Arts and Social Sciences (A&SS), the School of Education and Languages (E&L), the School of Science and Technology (S&T), and the School of Business and Administration (B&A) — were selected. The sample of courses was basically a convenience sample. All the 45 courses selected were 10-credit, 2-semester courses that began in April 2014. About a quarter of them were delivered in Chinese, and the rest in English. When the students were invited to respond to the online questionnaire in mid-July 2014, the semester had started for more than three months. The total number of students in the 45 courses was 2,532. In the similar survey in 2007, a total of 162 respondents from 34 courses made their responses (Choi, 2007).

#### 5 Results

The online questionnaire was posted for two weeks, and a total of 338 respondents completed it — a response rate of 13.35%. The comparatively low response rate is in line with the earlier studies, in which the return rates of students varied from 11.16% to 19.2% (see Choi 2006, 2007; Choi & Tsang, 2001; Tsang *et al.*, 2002). This can be explained by the fact that students in the OUHK have regular face-to-face tutorials and participation in the online forum is entirely voluntary, so their participation on the discussion board is very much affected. When the various presences, students' satisfaction and perceived attainment were compared between the students in Choi (2007) and the present study by an independent-

samples t-test and correlation analysis, the results were as summarized in Tables 1 and 2.

	Year	N	Mean	Std. deviation	Std. error mean
Cognitive	2007	162	2.9248	0.78435	0.06162
presence	2014	338	2.7153	0.88751	0.04827
Social	2007	162	2.6958	0.72684	0.05711
presence	2014	338	2.5328	0.85752	0.04664
Teaching	2007	162	2.6869	0.84244	0.06619
presence	2014	338	2.8156	0.94702	0.05151
Satisfaction	2007	162	3.7432	0.90009	0.07072
	2014	338	3.1651	0.98527	0.05359
Perceived	2007	162	3.2469	0.95196	0.07479
attainment	2014	338	2.8683	0.96800	0.05265

Table 1 Independent samples test of various dependent variables

From Table 1, it is obvious that when compared with the data collected in 2007, the mean scores on all the variables in the recent survey were lower, except the one for teaching presence. While the small increase in teaching presence is not statistically significant (p=0.126, 2-tailed), the decreases in all the other five variables were all statistically significant (p<0.05, 2-tailed). The significance levels of the differences in satisfaction and perceived attainment were even lower than 0.01.

To answer the first research question, we can conclude that the perceived cognitive presence and social presence both decreased from 2007 to 2014, while the level of teaching presence remained relatively stable. For the second research question, the mean scores on students' satisfaction and their perceived attainment in this study both decreased severely. For student satisfaction, it dropped from 3.7432 to 3.1651, a difference of 0.5781. The satisfaction level of students was now only slightly higher than 3, the mid-point of a 5-point Likert scale. For perceived attainment, it dropped from 3.2469 to 2.8683, a difference of 0.3786. The perceived attainment of students, therefore, changed from a positive to negative view.

 Table 2
 Correlation between students' satisfaction, perceived attainment and various presences of the Col model(N= 338)

Components of dependent	Cognitive	Social	Teaching
CoI model variables	presence	presence	presence
Perceived attainment	0.741**	0.653**	0.797**
Satisfaction	0.676**	0.518**	0.711**

\*\*p<0.01 (2-tailed)

Table 2 shows clearly that all the three presences in the CoI model are significantly correlated with students' satisfaction and their perceived attainment. The results parallel those in the 2007 study, in which both correlation analysis and multiple regression analysis revealed that the three presences in a way determine students' satisfaction and perceived attainment (Choi, 2007). The decrease in two presences could be explained as a drop-off in students' satisfaction and perceived attainment.

An earlier study (Choi, 2013) showed that the regular online tutor training in the past years had not enhance tutors' engagement in the discussion board, and the present study further showed that neither does it improve the effectiveness of the online communication tool in the eyes of students in the OUHK.

In the open-ended question at the end of the questionnaire, many students agreed that the discussion board can be a useful learning support, but both tutors and their fellow coursemates are not actively participating in the online communication platform. Some tutors did not initiate any discussion in the online forum and use it only a channel to deliver learning materials, such as PowerPoint files and documents. Some tutors did not response to students' question promptly, which further hinders the engagement of students. All these responses reflect that the low level of cognitive, social and teaching presences in the discussion board are also important factors that diminish the interest of students in participating in the discussion board.

# 6 Conclusion and discussion

There is little doubt that an online discussion forum can be used to enhance interaction between learners and their tutors, and among learners themselves. In the OUHK, however, both tutors and students were not actively engaged in the online discussion forum, although both parties acknowledged that the communication channel can enhance their interaction and serve as a useful support for learning (Choi, 2007, 2013). Most of the tutors had even completed an online tutor training course and mastered the basic skills of online tutorial, but this did not enhance their engagement in the discussion forum.

There could be a number of reasons which repress the enthusiasm for using the discussion forum in the University. First, there are frequent face-to-face tutorials for OUHK distance learning students, and tutors and students may not consider the interaction through the online forum to be necessary. Second, the interaction in the discussion forum is not counted in the formal assessment, so students have reservations about spending extra time and effort on it.

However, all the internal studies reveal that students' engagement in the discussion forum will be enhanced by both tutors' participation (Choi, 2007; Tsang *et al.*, 2002) and the level of cognitive presence, social presence and teaching presence (Choi, 2006, 2007, and the present study). The engagement of tutors and their online teaching skills indeed play a vital role in the success of the online discussion forum. In order to fully utilize the discussion forum to enhance collaborative learning and high-order thinking, further incentives and training for tutors zppear to be necessary.

A number of suggestions are worth considering. First, the content of the *Online Tutor Training* course, after years of implementation, can be revised and enriched. It is suggested that the various presences of the CoI model can be incorporated into the OTT course, so as to better equip novice tutors to master the skills and strategies for enhancing cognitive, social and teaching presences. Second, tutors' participation in the discussion forum, just like their performance in the face-to-face tutorials, could be monitored and become part of their appraisal. Last but not least, in order to guarantee timely online tutor support for the learners in need, a specific 'online tutor'

can be hired to take care of the discussion board. Online tutor should be responsive to students' questions and provide specific online tutorials for those who cannot attend face-to-face tutorials or require supplementary learning support.

Successful teaching and learning online involves not only the tutors, but the learners' participation is also critical. Some students do not actively engage in the discussion forum simply because they do not acknowledge the benefit of it or are not familiar with the online communication tool (Hew & Cheung, 2012). A major portion of the distance learners in the OUHK are working adults and they may have little, if any, knowledge of and experience in the use of an online discussion forum. Training sessions on the advantages and practical use of the discussion forum can also be provided for new distance learners, and this may help them to better understand the basic features and benefit of the discussion board as a learning tool.

In many distance learning programmes around the world, the engagement in an online discussion forum is included in students' assessment, and this is a strong incentive to motivate the students to actively participate. Of course, the use of a discussion forum is a means rather than an end, so the proposal to include online engagement as part of the assessment should be justified.

As is concluded by Hew and Cheung (2012) after reviewing more than 20 studies, limited student participation is 'a persistent and widespread problem' in the use of an online discussion forum. How to effectively incorporate it into distance learning is still an unsolved problem to be explored.

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# Transformation of conventional DL courses to BL courses: Use of multimedia and ID strategies

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Abstract: Distance learning provides flexibility for learners with regard to time and physical constraints. Distance learners can study at their own pace with the aid of various media technologies. Although printbased instructional materials are still playing an important role in many distance learning courses, blended learning — which integrates online with traditional face-to-face class activities — is becoming more and more popular and is well-received. Blended learning, which uses instructional design strategies to transform print-based materials into online components of blended learning courses, is worth exploring.

The present study aims to evaluate the instructional design strategies and multimedia components of four blended learning courses, which originated from print-based distance learning courses, adopting instructional design principles in multimedia learning (Mayer & Moreno, 2003). Students' perceptions of the effectiveness of using five multimedia components to enhance their learning are examined and evaluated. The objectives of the study are twofold: (1) to explain how the instructional design helps learners to learn effectively, and (2) to evaluate the usefulness of, and satisfaction with, the multimedia components. Qualitative data drawn from focus groups and an online survey of students who have studied these four courses provide useful comments on the design and on their learning experience.

**Keywords:** distance learning. instructional design, multiple representations, blended learning, multimedia components
## 1 Introduction

By definition, distance learning (DL) is 'planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangement' (Moore & Kearsley, 1996, p. 2). Traditional DL materials are print-based self-study materials which learners can study on their own. However, some research has shown that the attrition rates of various distance learning programmes are high (Akuamoah-Boateng, 2013; Parker, 1999; Simpson, 2004; Woodley, De Lange & Tanewski, 2001). In the Open University of Hong Kong (OUHK), the retention rates for a cohort of newly enrolled students in 2005 were 72.9%, 46% and 40% in the subsequent three semesters (Yuen, Lee & Tsang, 2011). According to the same study, one of the major reasons for dropout is that students found 'too many text materials to read and the courses were too difficult', which indicates one of the deficiencies of the conventional delivery system of distance learning.

Conventional DL materials in the OUHK are written by highly qualified local and international subject experts and experienced teachers. The comprehensive study units incorporate textbook readings, activities, self-tests and supplementary readings so as to provide a thorough learning experience for students. However, Precel, Eshet-Alkalai and Alberton (2009) argue that this kind of course delivery model creates a gap between the course developer, instructor, and the students, and therefore has a negative effect on the learning process and on student satisfaction (Bates & Khasawneh, 2007). As in many other DL programmes, students in the OUHK are also provided with face-to-face tutorials, but these are not compulsory, which means that students can complete their DL courses with or without attending these classroom tutorials.

With the help of the Internet and rapid advances in technology, students in the OUHK are given online learning support. With the Online Learning Environment (OLE), students can access the self-learning materials online and communicate with their tutors and course coordinators by emails or the discussion forum. However, in the conventional DL courses, such online support is relatively limited. Hauske (2007) suggests that effective learning materials should be able to activate and motivate learners, initiate learning processes, and foster understanding; and that simply providing documents or text-based materials is not sufficient. In line with this argument, Brown and Voltz (2005) point out that the strength of online learning over print-based DL is the ability to employ multiple media types to present ideas and concepts. They emphasize that multimedia materials, such as text, images, and sound and video, could be combined to create learning materials that suit learners with different learning styles and promote a higher degree of interactivity in the learning process.

To further enhance the effectiveness of text-based learning materials and students actual learning experience, incorporating multiple media types through an online learning platform is one possible solution. In this 'blended learning' (BL) approach, print-based instructional materials still play an important role in a course, but they are supplemented by many online components, in addition to traditional face-to-face classes. Research investigating the impact of blended learning has shown that students have better academic performance when compared with traditional distance learning (Castelijin & Janssen, 2008). Also, a study by López-Pérez, Pérez-López & Rodríguez-Ariza (2011) showed that the use of blended learning has a positive effect in reducing dropout rates and in improving examination marks. In blended learning, students can be more motivated and involve in the learning process, thereby enhancing their commitment and perseverance in their studies (Donnelly, 2010).

Therefore, it is valuable to investigate the ways to transform existing printbased DL courses into BL courses.

## 2 The use of multimedia and ID strategies

To successfully implement the DL-BL transformation, the use of appropriate instructional design strategies is crucial. How to synthesize the best possible blend of various media on the basis of existing self-instructional materials is not an easy task, especially keeping a balance between cost and quality.

In online learning materials, there are various kinds of media and representations, such as text, graphs, tables, audio, video, animation, and interactive dynamic visuals. Jong and van der Meij (2012) point out that multiple representations are important for learning. There are different learning styles among students — some of them learn effectively by reading text, and others prefer audiovisual materials; and student engagement also varies according to the different forms of representation available at the course site. Therefore, multiple representations can help to maximize learners' ability to retain information and maintain engagement (O'Keefe, et.al, 2014). In the transformation, the text-based DL courses are changed into multiple representations to suit the level, subject content, and the needs of learners.

Van de Meij and Jong (2006) conclude that there are several benefits of multiple representations, one of which is that it helps learners to build abstractions that may lead to a deeper understanding of the learning content. Ainsworth (1999) also asserts that learners will be motivated to learn by novel forms of representation, such as animations, videos, and linked pictures.

Mayer and Moreno (2003) point out that meaningful learning can be better attained when effective instructional design strategies are followed. They propose nine ways to reduce cognitive load in a learning environment containing multimedia resources, such as by avoiding a huge amount of complex material at one time, and providing signals or cues to help learners analyse the material. Another approach is to include an outline, or to add headings in a long section, to help learners organize a piece of text better. Breaking up the content into small pieces of information by pointform is also an effective form of presentation.

Learning motivation is a mixture of beliefs that cause people to initiate an activity and put in effort to achieve learning. Kawachi (2002) argues that learning motivation can be intrinsic and that learners tend to follow a deep-learning approach associated with better retention, application, and reflection. The use of video presentations can capture and maintain learners' attention and therefore promote learning. Zahn, Barquero and Schwan (2004) also suggest that linking video to learning facilitates knowledge acquisition because of the combination of different presentation formats.

Video clips, animation and PowerPoint presentations with audio and online interactive learning activities should all be thoughtfully integrated

in a blended learning course. Other online components, such as an asynchronous discussion forum and wiki collaborative learning tasks are also beneficial for blended learning courses. These components are able to facilitate students' higher-order analytical thinking skills, and promote their interaction and learning engagement (Cole, 2009; Judd, Kennedy & Cropper, 2010; Kim, Kim & Whang, 2013; Mokoena, 2013).

As a pilot run, a batch of four business DL courses in the OUHK were transformed into BL courses. The instructional design strategy adopted is multiple representations, and the effectiveness of this BL approach is also investigated.

## 3 BL courses in the OUHK

The present research is a preliminary study which investigates the effectiveness of using multiple representations in BL courses. The objectives of the study are twofold: (1) to explain how the multiple representations in BL help learners to learn effectively, and (2) to evaluate the perceived usefulness of, and students' learning satisfaction with, various BL components.

The relevant new BL courses are four undergraduate business administration courses, namely: *Introduction to Management; Introduction to Marketing, Introduction to Accounting I,* and *Introduction to Accounting II.* These four courses were originally delivered in conventional DL mode, with print-based study units being the major learning materials. Students were also provided with several face-to-face tutorials and online learning support, but the online components were limited to text-based study units at their own pace.

These four courses were transformed into BL courses, each of which is composed of several online components, viz.

• *Text-based materials with interactive activities and exercises*: Since it is difficult for adult learners to read lengthy text on the screen, the learning materials were chunked into smaller blocks. Also, to enhance the readability of the online materials, paragraphs with complex

concepts and long sentences were simplified or re-structured. Each section consisted of a number of interactive activities and self-test exercises, with immediate feedback, so as to consolidate students' understanding.

- *Video clips and PowerPoint presentations*: Difficult concepts or topics with heavy texts were replaced by video clips or PowerPoint presentations with audio sound tracks. Short quizzes were also embedded into the video presentation to evaluate students' learning.
- *Video lectures*: Some OUHK learners, owing to their own working schedule or travel, may not be able to attend all the face-to-face (F2F) tutorial sessions. In the BL courses, eight F2F tutorial sessions remained unchanged but they were also recorded and uploaded onto the online learning platform, and these became the 'video lectures'. Students who missed the tutorials or would like to review them could go online.
- *Discussion forum*: In order to promote interactions between students and their tutors, and among students themselves, discussion activities were encouraged in the asynchronous discussion forum. It is widely believed that such discussion can enhance students' higher-order thinking skills.
- *Wiki collaborative learning tasks*: Students were divided into small teams and worked on given tasks through the wiki tool, which promotes collaborative learning as well as critical thinking.

These five major online components were incorporated into the four courses. Basically, the adoption of the five components was based on the nature of the learning content, and the most suitable components were selected after considering their appropriateness and feasibility.

## 4 Methodology

The four BL courses were conducted in the April 2013 semester. At the end of the semester, an online survey was carried out, with the questionnaire being administered to students on the four courses. The respondents were recruited via an email invitation on a voluntary basis. A total of 115 respondents completed the questionnaire — a return rate of 11.4%. The

survey results are mainly concerned with the students' perception of the five components in the BL courses. Students perceived usefulness and their satisfaction with these components were investigated on a 5-point Likert scale; and the analysis of the questionnaire survey and their qualitative feedback are illustrated in this paper.

Besides the survey, five students from each of the four courses were invited to join focus group interviews. Through a number of in-depth semistructured questions, they were asked for their opinions on the use of the five BL components.

## 5 Findings

Students' opinions on the usefulness of the five BL components and their level of satisfaction with them are shown in Table 1. A mean score of 3 on the Likert scale represent a neutral opinion, and a mean score of 5 is strongly positive. All five components were perceived as useful for their learning, with the top two in the students' view being video lectures (mean = 3.87) and online materials with interactive activities/exercises (mean = 3.54). Both of them had a mean score higher than 3.5, which represents a comparatively stronger positive opinion. The other three components, however, had a mean score of less than 3.5 which showed that students found them only marginally useful.

Blended learning components	Perceived usefulness Mean (SD)	Satisfaction Mean (SD)
Online materials with interactive activities/exercises	3.54 (0.83)	3.64 (0.76)
Video clips and PowerPoint presentations	3.28 (0.85)	3.44 (0.81)
Video lectures	3.87 (0.78)	3.70 (0.74)
Discussion forum	3.25 (0.87)	3.15 (0.81)
Wiki collaborative tasks	3.21 (0.95)	2.96 (0.81)

 Table 1
 Students' perception of usefulness and satisfaction with blended learning components

It is worth noting that, while the mean score on video clips and PowerPoint presentations was only 3.28, the qualitative comments collected from the focus groups found the same component very useful — a point which will be further discussed in a later section.

The data on the satisfaction level were quite similar to those on the perceived usefulness. Students were most satisfied with the online materials with interactive activities (mean = 3.64) and video lectures (mean = 3.70). The discussion forum and wiki collaborative tasks got the lowest scores, which reflected that students' interaction and engagement in the online learning platform was not satisfactory. The mean score on satisfaction for wiki collaborative tasks was below 3 (mean = 2.96), which showed that the students were not satisfy with the online collaborative tool.

The online survey gave an overall rating for the five BL components, and students' opinions on the various components were collected in focus group interviews. The following sections illustrate the students' opinions after integration and consolidation.

#### 5.1 Online materials with interactive activities/exercises

Respondents indicated that the online materials provided them with flexibility in learning, at anytime and anywhere. Instead of hard copies of DL materials, which are quite heavy, they could now study in their office with a computer, or in a restaurant with a mobile device (such as an iPad). One of the advantages of online materials is that they provide instant feedback for the learning activities or self-tests. Students also found that the materials in the online learning platform were presented in smaller chunks, with the key points highlighted with coloured text, so that they could grasp them more easily. The embedded links also gave students a quick and easy way to look for further details, such as definitions and references, or even a useful article.

#### 5.2 Video clips and PPT slides with audio presentation

Although the respondents did not find the video clips and PowerPoint slides with audio presentation very useful in the online survey, most of the respondents in the focus groups agreed that online video clips could give them a better understanding of the main concepts. For example, one student said: 'I can learn faster because I find the audiovisual materials help me understand the ideas more easily. When compared with studying with the full text materials, I am more motivated and will not easily fall asleep'.

Another respondent agreed that video clips and PowerPoint presentations were useful for him, and he could grasp the main points, and understand the complex concepts in just a few minutes: 'The short video is very comprehensive and useful, and it saves me so much time as I don't have to go through the plain text', he said. Also, one student reported: 'The PowerPoint slides with voice presentation impress me a lot. They are not very long and it takes me five to ten minutes to understand an abstract and difficult concepts'. Some respondents indicated that they found the sign-posting features, such as arrows and keywords in the video clips or PowerPoint slide presentation, very helpful as they got them to focus on relevant key concepts. Finally, some of them claimed that they did not have time to go through all the video clips and PowerPoint presentations, but they would watch the presentations on the topics they did not understand.

#### 5.3 Video lectures

The video lectures were recorded F2F tutorial sessions by tutors, and the uploaded videos were prepared especially for those who were absent from the tutorial sessions. Some respondents, particularly those who could not attend all the tutorials, found the video lectures very useful — they gave them 'a sense of belonging' as they were conducted by their own tutors.

As one of the respondents explained: 'I find the video lectures very useful for me, since I am very busy at work and cannot attend the tutorial sessions frequently. I can "attend" the tutorials at any time I want. Sometimes, I watch some of the video segments repeatedly when the topics are very difficult for me'. Another respondent shared the same view but added, 'The tutor elaborated some of the topics in detail and provided more daily-life examples, which made me understand the concepts more easily. These video lectures in fact are far better than those in the video clips or PowerPoint presentations incorporated into the online content because the tutor provides more authentic examples for illustration. These are not found in the study units or textbooks. All these are very useful for me to understand the concepts and cases'. Another respondent said that the video lectures can help him to revise the study units before the examination, since the tutor usually summarized the whole unit in the tutorial.

However, a couple of the students stated that the video lectures were more suitable for abstract or complex concepts. If the tutors simply repeated what is said in the study units, these video lectures were not very useful for them.

### 5.4 Discussion forum

To facilitate learners' higher-order thinking and analytical thinking, two to three discussion questions were designed for each unit, and students were encouraged to participate in the discussions. One student pointed out that the discussion questions helped him to examine the issues critically and present his views in a logical flow in good English. But he added: 'However, it is very time-consuming to discuss an issue in the forum, and the discussion does not count in my assessment. Therefore, I am not keen on posting my opinion or comments in the discussion forum'.

One of the respondents claimed that she was disappointed with the low participation rate in the discussion forum. She explained: 'I put up my opinions on the discussion board and wait for some feedback from my classmates. However, I have waited for over one week and only one or two replies have shown up. I do not like this kind of discussion since there is no instant response. For me, F2F discussion sessions are much better, as I can really discuss with my classmates and tutor. When we discuss a case in the class, they would at least give me some response when I look at them!'

#### 5.5 Wiki collaborative learning tasks

Wiki collaborative learning tasks were incorporated into students' assignments. Students were required to post their answers on the wiki, comment on a fellow student's answer, and then respond to others' comments in their answers. Most respondents agreed that reading others' work on the wiki could broaden their perspectives and enhance their knowledge and experience. However, they found this task very time-

consuming, especially in a very tight schedule. Therefore, quite a number of them were not satisfied with this requirement. One respondent stated: 'I am a novice in wiki interactions and have not got used to this kind of collaborative task. Sometimes, it is difficult for me to have a teammate directly commenting on my postings'.

However, some respondents had a different view on the wiki collaborative learning tasks. As a student pointed out: 'I know I have to do some research and prepare my postings so as to fulfil the requirements. When I go through the process of information searching, I learn something and become eager to post my insights for comment. I find the wiki tasks quite interesting and they enhance my analytical thinking. However, it takes time to work on it and other classmates may not give comments on my posting immediately. I would say I am not very satisfied with this type of assignment'.

One respondents indicated that she did not want to go through the long postings made by her classmates because most of them are clumsy and their comments or perspectives are similar to each other. Also, some suggested that the wiki collaborative tasks are more suitable for subjects like management and marketing, but not accounting subjects, which focus on figures and procedures.

## 6 Discussion and conclusions

The present study examined students' perceived usefulness of, and satisfaction with, the five BL components. The survey suggested that students viewed all the five components as useful in their learning, but the video lectures and online materials with interactive activities/exercises were considered to be the most useful for learning, and students were most satisfied with them. The discussion forum and wiki collaborative tasks, however, were both marginally useful, and students even found the wiki tasks slightly unsatisfactory.

As in the online survey, the focus group interviews also showed that the immediate feedback and answers to activities and self-test in online materials were helpful. Conole (2013) states that one of the most important instructional design strategies is to align learning activities to ensure integrity across the course design, and these activities would promote deeper learning for online learners.

According to Buch *et al.* (2014), video-based learning is more effective than text-based learning for learners to memorize the content, and the key points and phrases displayed on the screen can highlight important concepts. The interviewees in the focus groups supported this argument, claiming that video clips and PowerPoint presentations promoted easier learning, facilitated understanding, and motivated them to learn. Although the results from the survey were not in line with those from the interviews, the video clips and PowerPoint slide presentations were useful for at least some learners.

With respect to the video lectures, the interviews showed that they facilitated students' memorization and understanding of the content. Most respondents reported that the video lectures provided them with great flexibility in learning and were also valuable in revising for the examination. Some respondents found the video lectures useful and satisfactory because they were conducted by their own tutors, which gave them a sense of belonging and connectedness in distance learning. This response was consistent with Manning (2005), who argues that the 'voice humanizes and personalizes', and so can convey a richer understanding of the teacher and content delivered. Online learners can, therefore, feel less isolated.

Although the discussion forum and wiki learning tasks were not well received in both the survey and interview, some respondents still recognized the usefulness of these communication tools which can enhance analytical thinking and collaboration. The major complaint was that they are very time-consuming tasks. It is therefore suggested that these two components should be used purposefully, and students themselves should be made aware of the purposes of these tasks, if arranged. Making participation in these tasks part of the assessment would be an effective way of promoting them.

In the present study, the respondents' perceived usefulness and satisfaction with the five BL components was verified to various degrees. The blending of different media components in online learning courses can, to certain extent, enhance students learning and their motivation. These results support the reported benefits of using multiple representations suggested by van der Meij and Jong (2006). However, the five BL components should not be treated as a panacea for use in all blended learning courses without careful consideration and design. Online materials with interactive activities/exercises and video lectures are widely accepted, and they can be used as core components in the BL courses. However, the other three components should be adopted with careful planning of instructional design strategies. The nature of the subject, the assessment requirements, and students' readiness to use a discussion forum or wiki, should be given careful thought when designing a blended learning course. A simple adoption of multiple representations in BL learning might not be the most effective way of delivering learning materials. In fact, Mayer and Moreno (1998) remind us that learners may have difficulties in relating different representations and determining the main line of the materials because they might be sidetracked by some of the representations.

Further studies are suggested to examine the effectiveness of different combinations of the various BL components, so that instructional designers have a simple reference for courses of a different nature and from different subjects.

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## Developing student learning support for graduate employability through entrepreneurial clinics

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Abstract: Improving the educational system is a key step towards creating graduates who possess the knowledge, skills and abilities to participate in the economy, locally and globally. Recently, developing graduate employability has become an issue of concern — how to ensure their successful transition to the labour market and their access to career-oriented employment, and also to create jobs. Graduates need to acquire the competencies that will allow them to find work and cope with unpredictable labour market changes. Reflecting this for open education, the Indonesia Open University (Universitas Terbuka/UT) — with a very large potential of 579,261 students (2014) spread out from Sumatera Island to Irian Jaya Island — continually seeks approaches and strategies to prepare its graduates for work. However, efforts to improve the distance learning (DL) system have encountered various obstacles, such as limitations in learning facilities, curriculum content, and the competency of graduates.

In addressing this issue, a survey showed that the majority of UT students, who are small to medium entrepreneurs, employees and job-seekers, need to have learning facilities to support them in developing certain competencies and skills to compete in the labour market. Therefore, this research aims to discover the prospects for a university entrepreneurial clinic which aims to develop an entrepreneurship spirit and graduate employability. The results show that, through informal curricula, the students urgently need to be encouraged to develop their confidence; to focus on high performance; and to have good, persuasive communication and negotiation skills. and an entrepreneurial spirit. This study discusses student learning support which will give UT and other education institutions an insight into developing graduate employability through a collaborative learning practice with interactive learning sessions, and considers the changes that could be made to improve the quality of teaching.

**Keywords:** open education, distance learning, student learning support, entrepreneurial clinics, informal curricula, employability

## 1 Background

One of a university's roles in teaching and developing knowledge is to prepare its graduates to adapt actively to innovation and knowledge creation, as well as respond to the requirements of the labour market. Thus, improving the educational system is a key step towards creating graduates who possess the knowledge, skills and abilities to participate in the economic area, locally and globally.

It is essential for higher education to recognize the global changes and not to be resistant to their influences while developing university governance (Teodorescu, 2006). Other studies emphasize that universities have to change from a rigid to a flexible culture and put innovative ideas into their policies (Choudhary, 2013); and, in doing so, they are encouraged to utilize knowledge to improve their competitive advantage (Cutcher-Gershenfeld, 1998; Nonaka, Toyama & Nagata, 2000). Other researchers argue that the important role of universities as creators of new knowledge is to emphasize and manage research and knowledge creation (Blackman & Kennedy, 2009; Scott, 1997; Sizer, 2001). Relating this to distance learning (DL) that needs to continually and actively engage in knowledge creation and innovation, curriculum development should intertwine with better development in e-learning support services, along with interactive learning sessions. Furthermore, independent self-study should be given greater encouragement, together with collaborative learning practice, as identified by Sahoo and Subhash (2014) — although, based on the findings

of Nicoletti *et al.* (2012), it can be argued that open education is a highly complex and costly process, especially with virtual teaching and learning.

Efforts to improve distance education have encountered various obstacles, such as limitations in learning facilities, curriculum content, and the competency of graduates (Bates, 2005; Nicoletti *et al.*, 2012; Phipps & Merisotis, 1999; Webster & Hackley, 1997). Understanding the context of DL systems is worth examining and, indeed, should be continuously explored through research to overcome such complex issues.

With regard to the dynamics of employment opportunities, developing graduates employability is one of issues of concern for open education to ensure graduates' successful transition to the labour market. Graduates need to acquire the competencies that will allow them to cope with unpredictable changes, as well as to find work, have access to careeroriented employment and, furthermore, to create jobs. However, there is little evidence that the education system can completely prepare its graduates with the specific knowledge and skills required to work in the highly competitive industrial sector. There is a fundamental gap between what universities offer and what employers really need.

The Indonesia Open University (Universitas Terbuka/UT) continually seeks approaches and strategies to address this issue, and attempts to prepare its graduates to pursue their career-oriented employment and to create their own businesses. Figure 1 shows UT's conceptual framework for developing graduate employability.

It is crucial for UT to highlight some of the competencies needed by industries because the requirements for a successful employee or entrepreneur in the coming years will be very competitive, and students who are well prepared with suitable skills will have a considerable advantage. In this process, student learning support can develop employability skills through some intensive exercises in collaborative learning practice with interactive learning sessions, such as an entrepreneurial clinic. Therefore, this research proposes to define the student characteristics needed to compete for and gain employment opportunities. This study also proposes a concrete model of student learning support which will help the Indonesia Open University and other educational institutions to develop graduate employability through an entrepreneurial clinic. Also, the changes that could be made to improve the quality of teaching are discussed.



Figure 1 Conceptual framework

## 2 Research methods

This research is concerned with a single issue in the Indonesian Open University — specifically in one of the branches that initiated this project — as a prospective model to be applied across the nation, and possibly open universities elsewhere. Some of the literature on case study methodology supports a single case study (Tellis, 1997; Yin, 1994) which is contextualized for this research. While its findings are not generalizable from this single case, it contributes to developing understanding from a broader theoretical perspective. This study collected data from a survey, interviews, and the academic literature. In brief, the research framework (Figure 2) addresses the operational steps in this research. The sample was all the participants at the clinic: 120 UT students in the intake for the second semester, which was their final semester in 2013. The participants in the entrepreneurial clinic were asked to complete a questionnaire related to their knowledge of entrepreneurship, their interest in starting up a small business, and some skills that they need to improve to foster interest in entrepreneurship.

In addition, the study was conducted in several stages, adopted from research by Moekijat (1991). First, the students who would take the scientific work in their final semester were grouped, based on their major study area. Second, they were encouraged to investigate issues related to accounting management, production, marketing or communication; and they focused on solving problems of SMEs related to these issues. Third, the students were equipped with an understanding of SMEs and Indonesian National Standard (Standar Nasional Indonesia/SNI) before commencing fieldwork. The level of students' understanding of SMEs and the SNI concept was measured through a pre- and post-test. Fourth, the scientific papers developed by students could be used as a reference for the development of SMEs in Indonesia. Also, the paper could be developed further as their thesis, one of the requirements for graduation.

In order to explore the students' employability, the researchers also interviewed SME professionals and alumni as the external stakeholders of UT. This was conducted by identifying all SMEs in the industries in Bogor district and visiting them to discuss some issues or problems faced by SMEs and some possible ways of resolving them. Of the 20 SMEs listed, only ten responded and were willing to be interviewed and have further partnership with the University. In addition, the researchers also interviewed ten alumni who had created small and medium businesses for goods, food, electronics, handicrafts, fish and farms, tourism, and beauty services. These interviews explored their success stories in entrepreneurship and their feedback on UT's curricula to support graduate employability.



Figure 2 Research framework

## 3 Findings and discussion

This case study in UT's Bogor regional office investigates the enthusiasm of students from all faculties for joining an entrepreneurial clinic. The 120 students were from the Faculties of Economics, Mathematics and Natural Science, Sociology and Political Science, Teacher Training and Education Science. The findings showed the top three majors which were enthusiastic about entrepreneurship, viz. management, communication and accounting at 33%, 20% and 18% respectively. It was found that the rest of the faculties were not really interested in the topic of entrepreneurship due to the personal interests of the students, although they attended the clinic activities in order to begin to learn about entrepreneurship. Therefore, convincing them about the importance of this activity was very challenging, but it was worth encouraging students to be successful in any path they chose after they graduated.

This study explores students' preference for studying small and medium enterprises (SMEs) and writing it into their scientific work. In this case, the UT facilitates and supports the contribution of knowledge to a broader community. This fits with the current mandate of compulsory scientific publications established by the Director General of Higher Education No. 152/E/T/2012 regarding compulsory scientific publications and UT Rector's Decree No. 7592/UN31/KEP/2012 on the application of scientific writing and scientific publications. Furthermore, this research explored the employability criteria as well as the enthusiasm for entrepreneurship.

The entrepreneurial clinic succeeded in motivating 53% of the students to create their own businesses after graduation. However, the remaining 47% chose to be employed as government officers or private employees. In this case, a lower interest in being entrepreneurs related to the background of the respondents, who were employees (80%), SME professionals (10%) and job-seekers (10%). The majority had permanent or temporary jobs, but were considering creating SMEs after gaining adequate capital from savings. The job market for employment in Indonesia is highly competitive and, at the moment, seeking a job is the first priority. Based on the interviews, people shift to create a small business if they have plenty of capital, or because they have suffered from work stress as subordinates or have had a long period of unemployment. It is not a common understanding that entrepreneurship is an independent choice and, even more, a spirit to manage an independent life. In addition, some students said that they were not confident yet about starting their own business due to lack of knowledge, skills and experience in SMEs.

The survey also showed that the students urgently needed to be encouraged to develop their confidence (82%), to focus on high performance (76%), to have good persuasive skills (76%), and communication and negotiation skills as influencing skills (76%) in informal curricula (Figure 3).



Figure 3 Distribution of participants by most preferred employability factors

Ten alumni and ten SME professionals, as the external stakeholders of UT, confirmed these employability traits for the success of new graduates in coping with and competing in the labour market. The interviewees stressed the urgency for helping students to improve their capacities on those four crucial characteristics.

It is critical to develop these employability traits in the curricula for students' further activities. It has been demonstrated that the key elements required for effective courses are not only academic content but also the development of motivation (Nash, 2014). Self-confidence is essential to make students believe in themselves, as higher self-confidence can lead to higher performance in that they can take smart risks, and be innovative and creative in completing tasks. Students are also encouraged to develop some strategies for influencing others, so that they have the ability to communicate their ideas persuasively and also have good negotiation skills. Those essential characteristics should be fundamental priorities for UT in disseminating approaches through the informal curricula. Lecturers should encourage the same attitudes among students and provide the best atmosphere for learning.

The result of the survey also identified some basic issues experienced by SMEs — low productivity and lack of skilled staff in terms of marketing

and communication. The SME professionals revealed that most often the constraints on SMEs in obtaining financing support from banks or other financial institutions are due to lack of negotiation capability, accounting knowledge and business intuition. As defined by Primiana (2009), the skill of business creation and management, entrepreneurship motivation, and collaboration initiative become central concerns for SMEs in Indonesia. Those issues indicate the importance of further collaboration between SMEs and universities (Wibowo, 2013), especially with open education, through concrete collaborative learning practices with interactive learning sessions, such as an entrepreneurial clinic.

The University entrepreneurial clinic bridges the synergy of partnership between small and medium entrepreneurs and banking services to conduct trainings and internship and to provide good practices on entrepreneurship and credit monitoring. This programme involves all the relevant stakeholders, including regional governments, banks, SMEs and alumni. The entrepreneurial clinic is a business incubator for UT students in their last semester. On the other hand, SMEs can support tutors and lecturers in understand the industry standard competencies, as well as improving the informal curricula.

This entrepreneurial clinic is an essential programme for preparing students and facilitates the transition from the UT's DL system to the labour market in which certain soft skills and capacities are required. In addition, it can motivate students to further create their own businesses after they graduate. Job creation involves a significant effort to provide more job opportunities. This University entrepreneurial clinic framework can be developed and disseminated to generate student learning support across the nation.

The current research has found that DL and face-to-face learning activities do not result in any significant difference in improving students' success (Özmen & Atici, 2014). However, DL typically has online education with less interaction between lecturers and students than face-to-face classes. To some extent, this situation may affect students' ability to communicate their ideas, to make solid arguments and to have critical thinking. The entrepreneurial clinic may overcome this by providing a supportive environment for learning within intensive meetings with teams and mentors encouraging students to solve the case problems, express their ideas and arguments, focus on good process and results, and write a report.

Also important is an internship under the monitoring of SMEs. Students are encouraged to write a report not only to produce a mandatory thesis but also to sharpen their analytical thinking on problem-solving for SME cases. They can also relate some lectures they receive from tutors to a learning process in which theory and practice can support or contradict each other. This approach can develop students' critical thinking.

In order to improve the understanding of industry standard competencies, this research suggests that UT should strengthen its partnership with SME professionals, large company practitioners and alumni to discuss further the complexity of graduate employability. In addition, UT alumni should be given a periodic survey as a tracer study to let them tell their success stories or give some feedback to UT on their experiences. This approach will benefit the University as well as assess the preferences and concerns about future strategies for quality improvements (Beaver, Johnson & Sinkinson, 2014).

Another service offered by the clinic that helps students to learn and start their own businesses is an interactive website on http:// entrepreneurialcampus.com/. This is an online platform which showcases some small businesses created by students and some entrepreneurial creative ideas. As the scope of the site also encompasses specific issues on ways to start up a small business, there is an online forum for discussing entrepreneurial questions and answers hosted by some SME professionals and tutors. This site is expected to be an official forum for UT alumni to share their entrepreneurial experiences. This becomes important as it will strengthen the motivation to utilize online resources, especially when they are well-designed, accessible and trustworthy (Beach & Willows, 2014).

Finally, online education requires interactive media in which tutors are encouraged to maintain communication with students by giving immediate responses to students' questions, ideas or problems. In such a supportive atmosphere, students learn to be more confident in both expressing their ideas and performing appropriate actions.

## 4 Conclusions

This research contributes to developing student learning support through an entrepreneurial clinic in a university. This clinic has been piloting programmes that cultivate attitudes of self-confidence, a high performance orientation, effective communication, and influencing strategies in students. Writing skills can be developed through intensive exercises in internship under the clinic's scheme. This student learning support has created a partnership among educators, SME professionals and alumni to refine the employability traits and adapt them into informal curricula. In order to improve the DL system for graduate employability, the University should strengthen supportive learning and encourage educators to improve two-way communication both in classrooms and through online teaching media.

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# MODeLing: Reinventing MOOC through a learner-centred approach

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Abstract: MOOC has taken various shapes and sizes since its beginnings in 2008 and its boom in 2012. Various education providers, both residential and open universities, have grappled for ways to implement different versions of MOOC in efforts to address the major issues surrounding this mode of delivering instruction. Backed by its more than 10 years of offering degree and non-degree programmes in the distance e-learning mode, the University of the Philippines Open University (UPOU) embarked on developing and offering its own MOOC under the framework that it is using for its online courses. The resulting framework, MODeLor Massive Open Distance eLearning, was tested in three MOOC offerings of the University. This paper aims to: (1) describe the MODeL framework and (2) present the initial results of the application of the MODeL framework to the UPOU's MOOC offerings. The data used in this paper are the results of a content analysis of the process documentation of the University's MOOC offerings. The findings of this study can also guide other universities who are planning to offer their own MOOCs.

Keywords: MOOC, student support services, quality framework, distance education

## 1 Introduction

MOOC has become the buzzword in education over the last five years. Many academic institutions, residential and open universities alike, have offered their own MOOCs and the number is still increasing. While the MOOC model has been around since 2008 (Parr, 2013), it was only in 2012 that the number of universities, professors, and learners who became part of this teaching and learning environment became significantly noticeable to the extent that many even regarded it as a disruption to the conventional mode of education. The New York Times declared 2012 as the 'Year of the MOOC'. The year 2013, however, was described as the 'Year of Anti MOOC' by George Siemens who, together with Stephen Downes, created and offered in 2008 the course 'Connectivism and Connective Knowledge', which has been widely regarded as the first true MOOC (Parr, 2013). In 2013, MOOC was seen to be 'in a period of flux and that criticism is mounting' (*ibid.*) because the 'biggest failing of the big MOOC providers is that they are simply repackaging what is already known rather than encouraging creativity and innovation' (ibid). There are other issues surrounding MOOC in its present form, such as the perceived intellectual neo-colonialism, given the 'one-way transfer of educational materials from the rich north to the poor south' (Rivard, 2013); the low course completion rate (Quillen, 2013); quality which hinders the acceptance of MOOCs for credit or to fulfil the requirements to earn a degree (Mazoue, 2013); and cheating and plagiarism (Pappano, 2012; Chen, 2014). Despite these criticisms, the MOOC framework provides opportunities to concretize open access to education and a mechanism for lifelong learning and inclusive education. This perspective prompted the University of the Philippines Open University (UPOU) to develop its own version of Massive Open Online Courses characterized by the basic features of MOOCs and the theoretical grounding and quality framework for distance e-learning. The resulting framework is Massive Open Distance eLearning or MODeL.

This paper describes the MODeL framework; presents the initial results of the application of the MODeL framework in MOOC offerings; and provide recommendations which can guide other institutions in developing and offering their own MOOCs.

#### 1.1 A brief background to UPOU

The University of the Philippines Open University (UPOU) is one of the constituent units of the University of the Philippines, the premier university in the country. Established in 1995, UPOU was mandated to democratize access to quality higher education by offering courses in the distance education mode of instructional delivery. In 2001, UPOU started offering its courses online through a virtual learning environment. The offering of MOOCs is in line with the University's advocacy of openness in higher education and being a public service University. UPOU also hopes to contribute to expanding the literature on MOOC and be part of the continuing discourse on this phenomenon that is change the landscape of education and the essence of universities.

### 2 Research methodology

The data used in this paper were drawn from a content analysis of the documentation for the University's MOOC offerings. The process documentation covered the preparations for the offering of three MOOCs and their monitoring while the courses were being offered. The activities documented include the Round Table Discussions (RTDs) on the University's advocacy of openness in education vis-a-vis its mission, vision, and mandates, and the MOOC's place in the overall scheme; MOOCathon, a workshop to determine the design and features of the LMS for MOOC; and the customization of the LMS based on the requirements of the learning design and assessments. Documentation was done through video and audio recordings of the activities/events and transcribing them later; profiling the MOOC learners; and basic learning analytics which took into consideration the learners' visits to the course site and other activities, such as viewing the course materials, interaction with other learners, and completing learning activities.

Specifically for this paper, the content analysis took into account the following factors: learner-centredness, the perspective that UPOU has taken since its inception; quality assurance pillars for distance e-learning which include among others instructional design integration into course development, appropriate technology components, and teacher and learner support; the use of OERs; learning design which should promote the social construction of knowledge; MOOCs for credit through the assessment and certification process; and a possible sustainability model.

## 3 Results and discussion

#### 3.1 MODeL as MOOC framework

UPOU adopted the stance that MOOC is simply a distance e-learning course made open. Hence, it drew insights from its more than ten years of offering academic/degree programmes in this mode in an effort to craft its own brand of MOOC. In this attempt to develop its own framework, the University considered the following concerns or criticisms about MOOCs: the quality of instruction/education; the perceived intellectual neo-colonialism; plagiarism or academic dishonesty; the low completion rate; and recognition of Statements of Accomplishment for course completion.

The resulting framework — MODeL or Massive Open Distance eLearning — has the following features:

- 1 It is open. There are no admission requirements for one to participate in the courses. It is implied, however, that the learners should have a good grasp of the English language which is the announced medium of instruction. Also, since the course is online, it is implied that the learners should have basic knowledge on the use of the computer and Internet and have regular access to these facilities. Additional requirements specific to the courses, such as a gmail account for one to participate in google hang out, or a YouTube account are stated when the courses are advertised for offering. Anyone who is simply interested in the topic can sign up for the courses and be part of the teaching-learning environment. The courses do not charge any fee for registration.
- 2 The courses and the learning management system (LMS) were designed for massive enrolments or enrolments which could go beyond 150. This minimum number of 150 (Reinhardt, 2013) was based on Dunbar's 'magic number' (RSA, 2010) as explained below:

Dunbar argues that we are only able to manage about 150 contacts simultaneously, our brain is simply unable to deal with more. So, a MOOC only is a MOOC if the number of participants is well over 150. Then it contains multiple overlapping communities and each individual is an active member of only some of those. And only then it becomes 'massive' and technology is needed to keep track of its behavior, to help its participants, to assess their products (Reinhardt, 2013).

The LMS for MOOC developed through MOOCathon has the following features. an open source system; accommodates multimedia formats of learning content, such as video, podcasts, texts, and options for language to cater for various learning styles and preferences; allows interaction among learners and peer reviews; can automate assessments; can be customized for assessments to happen at a specific time and allow video responses from learners; and can accommodate future alterations or further customization or integration of additional plug-ins for the specific requirements of courses. The resulting LMS is powered by Moodle with the required open source plug-ins (Figures 1 and 2).



Figure 1 Screenshot of the LMS customized for UPOU's MOOCs/MODeL with the plug-in Youtube anywhere mainly used for assessment



Figure 2 The learning cube integrated in the LMS where the MOOC learner can have a choice of his/her learning pathway: access of material through video or podcast or text; and the language (English or the local dialect)

The courses were designed to take into consideration that the mode of delivery is distance e-learning which, as the term implies, is a convergence of the distance mode of instructional delivery — where the learners and teachers are geographically separated from one another and also from the educational institution which offers the courses — and e-learning which maximizes the affordances of modern information and communication technologies to adopt different multimedia formats of instructional content. These formats include video materials, podcasts and text.

3 The pillars or domains of quality in the quality assurance framework for open and distance e-learning considered were those found to be common in the three QA frameworks for ODL: The Institute for Higher Education Policy (2000); Frydenberg (2002); and Jung *et al.* (2011). These domains are as follows:

- a *The backing of an academic institution in offering a MOOC*: This is implied in the domain/benchmark institutional commitment/ support, vision/mission/goals, and leadership, governance and administration. It should be noted that in the early generation of MOOC, learners' learning was certified by the individual professor or course coordinator. The institutional presence and backing up somehow implies that the quality standard that the university adheres to will also be applied to the MOOCs which it offers.
- b *The course development process*: Just like any other course offered by UPOU, the development of the course package for the MOOC followed the quality circle approach. This consists of the involvement of the various experts to produce quality course packages. The members of the quality circle are: the expert who develops the content; the instructional designer who looks into the appropriate chunking of the lessons and fitting them to the learning goals, content and assessment; and the multimedia specialist who determines the media format that best delivers the content based on the stated learning goals. Another expert also reviews the content of a course.
- c Instruction/teaching and learning and the instructors: As with any other courses, how the instruction is carried out and who does it are major quality concerns. One of the strengths and, in fact, attractions of the early generation MOOC was the expertise of those handling the courses, who were from well-known universities and experts in their fields. The MODeL Framework also considers how the teaching is done, given the massive enrolment through the combination of direct instruction on the content by the teacher/expert and directing learners to the OERs on the topic; and connectivism and constructivism are both facilitated through the formation of online learning communities. The online learning communities also make possible peer assessment. MODeL courses were designed so that the four types of interaction shown

to promote social construction of learning had been integrated: learner-content interaction; learner-learner interaction; learnerteacher interaction; and learner-community of practice interaction.

- d Learner support: The integration of learner support into a MOOC was also subject to debate and discussion, given the large number of students enrolled in the courses. Integrated into the MODeL Framework are various components to support learners' completion of the online courses. These include an orientation to distance e-learning through a Distance eLearning Readiness module and video materials about the course, using the LMS, and distance elearning in general; the automation of some processes to guide the students (e.g. signing-up for the course and accessing the course site); making basic information available through email and on demand through links in the course portal (e.g. where to seek assistance); and a support team to provide technical support to both learners and teachers. The LMS also allows monitoring of learners' activities and tracking their progress. The sending of mass notifications to specific groups of learners can also be done, such as reminders about course deadlines, and new materials uploaded in the course site. Learners who are at risk, or who have not been accessing the course site for a period of time, can also be monitored for the implementation of appropriate interventions.
- e *Assessment*: In all the contexts of learning, assessment has always been viewed as a major consideration in determining quality, especially the integrity of the process. In most MOOCs, assessment is automated because of the number of students. In the MODeL framework, formative assessments (e.g. quizzes) are automated in order to provide learners with immediate feedback. Final assessments, however, can be designed to require learners' contextualization of the responses and video capturing of their answers to the assessment questions. The e-Portfolio system was also integrated into the course portal to monitor learners' progress as well as the consistency and authenticity of the responses to the assessment questions. This assessment mechanism is particularly critical during the certification process which is done in addition

to the Statement of Accomplishment usually given upon course completion. The assessment mechanism was also designed to address the concerns of academic dishonesty, the quality of learning, and the recognition of learning through MOOC for credit towards degree and employment purposes.

- 4 The course materials make use of OERs and, in the absence of appropriate/relevant OERs, such content is developed/produced as in the case of video materials. The development or production of all-original course materials is also necessary to address the concern about the perceived intellectual neo-colonialism which characterizes most MOOC offerings.
- 5 MOOC or MODEL courses should be self-sustaining for them to persist and deliver their promise of making education available especially to underserved groups and sectors of the society. Assessment and certification of MOOC completed for 'MOOC for credit' and 'MOOC for employment' are revenue streams considered in the MODEL Framework.

## 3.2. Pilot run of UPOU MODeL courses

To date, UPOU has offered three MODeL courses in collaboration with industries. The first was on the development of mobile apps using the Android platform that was developed and offered in partnership with a leading telecommunications company in the Philippines. This MOOC registered more than 700 learners which could be attributed to the fact that Android apps developers are very much in demand in the country. The other two courses were on the Fundamentals of Business Process Management (BPM101), and Business Communication (BUSCOM) that were both developed and offered in collaboration with the Business Process Outsourcing (BPO) industry where the Philippines has been regarded as the leader. These courses were offered as MOOCs to increase the talent pool for the BPO industry which had shown impressive growth during the last few years and was projected to grow more vigorously in the coming years. Each course was implemented for six weeks and has 390 and 425 enrollees respectively, most of whom expressed interest in being part of the BPO
industry as their reason for enrolling in the courses. On average, more than 90% of the learners were observed to view/access the course materials but only about 60% participated actively in the course activities, e.g. discussion forums and taking quizzes. About 40% have qualified for the certification track based on the number of course requirements completed.

#### 4 Insights and recommendations for consideration

The following insights and recommendations can be drawn from this study:

- 1 For MOOCs to attract learners, they should address the development of skills needed by industry and should offer opportunities for employment or professional advancement. These opportunities can serve as a motivation for learners to complete their courses and aim for certification.
- 2 Possible revenue streams should be identified to sustain MOOC offerings. Costs associated with offering MOOC such as LMS hosting, a technical team, and teachers'/markers' fees for assessment and certification should be considered.
- 3 A sound quality framework should be integrated into the course design to give value to the Statements of Accomplishment that are given to those who complete the courses.
- 4 Industry partnerships can be considered to address the relevance of the knowledge and skills obtained through MOOC enrolment and recognition of MOOC completion certificates for employment. The involvement of experts from industry provides additional credibility to the course content.
- 5 The main consideration in MOOC is not the number who enrol, but the number who are able to complete the courses and are properly assessed through a rigorous and pedagogically sound assessment mechanism.

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### Embarking on MOOCs: The OUM experience

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Abstract: As the leading online distance learning university in Malaysia, Open University Malaysia (OUM) is committed to providing and supporting lifelong learning. With this aim, OUM recently initiated several innovations, including embarking on a pilot massive open online courses (MOOCs) project. The term 'MOOC', coined in 2008, was first used to describe an open online course offered by the University of Manitoba in Canada. Since then, it has become an 'educational buzzword' (Daniel, 2012), with many public and elite universities offering MOOCs as part of their range of online learning options. This paper examines OUM's foray into this recent trend in online education, which makes learning material and content freely available to large numbers on the Internet. Apple's iTunes University was selected as the platform for offering learning material for an initial five courses. The issues and challenges encountered by the University's Centre for Instructional Design and Technology (CiDT), which spearheaded this project, are highlighted. The paper outlines the problems faced — from the seamless collaboration needed to tap the diverse skills of faculty members, instructional designers and technical experts, to getting the faculty staff to 'buy-in', as well as coaching and mentoring. This discussion paper also highlights possible solutions to the challenges encountered by the pioneering team, tips on the design and branding of the public site, and criteria for the selection of courses and the development of supplementary learning materials, such as video lectures, iCasts, and learning segments. As more and more higher education institutions are expected to embark on similar MOOC initiatives in the near future, it is hoped that this paper will provide perspectives and guidelines to others keen to learn from the OUM experience — especially on what works and what could be done differently.

**Keywords:** open learning; quality assurance, massive open online courses, iTunes U, student satisfaction

#### 1 Introduction

Massive open online courses (MOOCs) are often touted as a watershed in higher education, with some describing MOOCs as 'the most important education technology in 200 years' (Regalado, 2012). The MOOC movement has been likened to a 'digital tsunami threatening to sweep aside conventional university education (Boxall, 2012). However, MOOCs are not without detractors, with some calling them disruptive. It is not the purpose of this paper to look into the merits and demerits of MOOCs — rather, this article accepts that MOOCs offer educationists the opportunity to explore alternative models of course delivery and to relook at pedagogy with fresh eyes (Allen & Seaman, 2013).

At Open University Malaysia (OUM), the Centre for Instructional Design and Technology (CiDT) is tasked with developing learning material for the University. At the same time, it also explores new platforms for content delivery that will engage learners and offer them a quality learning experience. Ultimately, this translates to creativity and innovation. This paper highlights two such innovative initiatives at the University, viz. OUM App and OUM MOOC.

# 2 New media technologies in learning — OUM App and OUM MOOC

The journey to developing OUM MOOC started with the development of OUM App in 2012. As the publishing house for OUM, CiDT has a dedicated team of about 60 staff, comprising instructional designers, editors, graphic designers, desktop publishers and multimedia programmers who work alongside subject matter experts to develop the varied learning materials. As of September 2014, CiDT has developed 1,180 print modules, 330 study

guides, 781 HTML modules, 117 video lectures, about 200 learning capsules and segments, 40 audio books and numerous types of courseware.

In 2012, CiDT developed OUM App which gave learners registered for OUM's Bachelor in Human Resource Management, Bachelor in Business Administration and Bachelor in Management the option of downloading learning materials via iPads. Launched in July 2013, OUM App started with an initial 30 modules and by December 2013, the platform had been extended to include IOS and Android platforms. By September 2014, 136 modules had been uploaded onto OUM App. It was OUM App which led to Apple Malaysia inviting the OUM to join the iTunesU family and pave the way for the setting up of OUM MOOC. Initial discussions were held in March 2014. The time seemed right for OUM, as the premier ODL institution in the country, to initiate a MOOC. The target launch date was set for 3 November 2014.

#### 3 Elements to consider when developing a MOOC

There are many issues which need to be considered when embarking on a MOOC initiative. This paper highlights the main problems encountered.

#### 3.1 Choosing an appropriate platform

Among the first questions raised was: 'Why iTunesU?' There are so many MOOC platforms to choose from, such as Coursera, edX, Udacity and Udemy. Some are free, while others impose fees. OUM opted for the Apple iTunesU platform for the following reasons:

- 1 Everything is in one area, with course facilitators being able to schedule classes, upload presentations, embed videos, and add PDF files and Word documents. And once downloaded into the library, participants could easily access them and start a discussion.
- 2 There is iPad and iPhone integration, which avoids the need to repackage learning material or chunk video lectures into smaller files as pre-existing material from OUM App could be uploaded in its entirety in iTunesU

- 3 The asynchronous nature of iTunesU made it straightforward to manage as CiDT needed time to train facilitators to manage a MOOC.
- 4 It has an extensive reach. A search for philosophy classes available from iTunesU turned up over 300 choices, including some from top universities in the world.

#### 3.2 Faculty buy-In and support

The first phase of the project saw the uploading of material for five courses, namely *Principles of Corporate Communication, Software Testing, English for Written Communication, Thinking Skills and Problem Solving, and Strategic Management.* The selection was based on three principles — these courses were hugely popular; the modules had recently been upgraded; and there were video lectures for all the courses. In addition, another 12 modules were partially uploaded, bringing the total number of modules uploaded onto iTunesU to 17.

However, uploading learning material is only the initial stage. A MOOC needs 24/7 support; and so there is the need to train faculty staff on how to manage a MOOC on the iTunesU platform. After OUM on iTunesU went live on 8 July 2014, Apple Malaysia conducted an intensive training programme for 16 faculty members in early September 2014.

#### 3.3 Creating quality content

As content uploaded onto iTunesU is made available to learners globally, it has to be of benchmarked for quality to safeguard the University's image and branding. Fortunately, CiDT had initiated a module upgrading project called 'the Red Spine Module project' in 2012 and this provided a ready database of modules to be developed as MOOCs.

#### 3.4 Repurposing content?

To make sure learners had access to a wide enough range of learning materials, links were created to existing open educational resources (OER) — YouTube videos, podcasts, and OUM's iRadio learning segments/ capsules, as well as audio books for the visually impaired.

#### 3.5 Quality assurance

There were three points of quality assurance for the OUM MOOC. Firstly, modules development at OUM are certified by ISO-9001:2008. Secondly, these modules were upgraded under the University's Red Spine Module project. And, finally, content on iTunesU is vetted and approved by Apple to ensure only quality content is available for public viewing.

#### 3.6 Design and layout

The team had to come up with a layout and design that encapsulated the University's image and vision. After much deliberation, the team opted for a clean look and feel, with minimal text. The guiding principles for visuals included vitality, vibrancy, happiness and love for learning. Pictures of people from different age groups and walks of life, as well as both genders, were selected.

#### 3.7 Technical specifications

Multimedia files in iTunesU had to be converted to MP4, M4V or MOV (image and video) or MP3 (audio). The team experimented with the technical specifications for optimum audio and video quality.

#### 3.8 Copyright and fair use

Copyright issues can be tricky in MOOCs, especially since copyright laws vary from country to country, and institutions need to ensure they are not subject to the laws of other countries if their student body attracts many participants from a single country (Mangan, 2012). Infringements may result in learning material being removed by Apple, with the site closed down. To prevent this, efforts were made to create as much original content as possible. The use of non-original material was limited to factual material which had a lower risk of infringement.

In cases where a cited work was constantly referred to, a caveat was given to encourage learners to buy the book. In video recordings, 'popular' music was avoided. Also, as plagiarism can irreparably damage the reputation of an educational provider and devalue the qualifications it confers (Young, 2012), the software Turnitin was used to detect plagiarism when developing learning material. The critical threshold acceptance point was set at 30%.

#### 4 The OUM model

The core team worked very hard for about five months from March to plan its debut on iTunesU. On 8 July 2014, OUM on iTunesU went live, making OUM the first university in Malaysia to be part of the iTunesU family. The implementation plan is summarized in Table 1.

Task/Month		Ap	oril			М	lay			Ju	ne			Ju	ly			Au	gust		Se	epte	mb	er	(	Octo	bei	r
Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	
Planning																												
<ul> <li>Identify current situation</li> </ul>																												
<ul> <li>Develop the project plan (development team, resources and time frame)</li> </ul>																												
<ul> <li>Set the project scope</li> </ul>																												
<ul> <li>Define the course to be developed</li> </ul>																												
Analysis and Requirement																												
<ul> <li>Define business requirement</li> </ul>																												
<ul> <li>Browse through University sites</li> </ul>																												
Design																												
<ul> <li>Propose solution for look and feel (banner, thumbnail and cover of modules)</li> </ul>																												
Development																												
<ul> <li>Organise content</li> </ul>																												
<ul> <li>Edit and develop learning material</li> </ul>																												
<ul> <li>Compile all materials</li> </ul>																												
Integration and Testing																												
- Upload all materials																												
<ul> <li>Fine tuning</li> </ul>																												
<ul> <li>Publish</li> <li>OUM iTunes U site publish to live</li> </ul>																												

Table 1 The implementation timeline for OUM on iTunesU

#### 4.1 Benefits and feedback

One immediate benefit was the boost in the image and branding of the University. As the first university in Malaysia to be accepted on iTunesU, OUM now 'stands tall' among other top-ranked universities, such as Stanford University, Oxford University, the Open University of Hong Kong and the Open University of the United Kingdom. The debut on this platform is testimony to the quality of OUM's learning material and its commitment to democratise education.

The modules were uploaded in PDF colour format, together with slides, video lectures, learning capsules and audio books. Feedback (as measured by the number of downloads up till 18 August) was tabulated, as shown in Table 2 and Figures 1 and 2.

There were 887 downloads of OUM-iTunesU learning material within one month of its going 'live'. As seen from Table 2, the top five modules downloaded were *Strategic Management* (494), *Thinking Skills and Problem Solving* (159), and *Software Testing* (123), *Principles of Corporate Communication* (46) and *Human Resource Development* (6).

Top Courses	Downloads
Strategic Management	494
Thinking Skills and Problem Solving	159
Software Testing	123
Principles of Corporate Communication	46
BBDH4103 Human Resource Development	6
BBPW1303 Financial Management I	6
BBPM2103 Marketing Management I	4
CBKI4103 Knowledge Management	4
ABPG1103 Introduction to Psychology	2
English for Written Communication	1

 Table 2
 The ten modules with most downloads (8 July to 18 August)

In terms of activity (as measured by the number of downloads) by country, Figure 1 shows that the top five countries were the United States of America (25.3%), Malaysia (18.7%), Australia (7.47%), China (6.15%) and South Africa (5.34%).



All Activity (Number of Downloads) by Country

Figure 1 Activity by country (8 July to 18 August)

Figure 2 shows the number of visitors by country. Within the research period of five weeks, 258 visitors had checked out OUM on iTunesU. Of this figure, 29.4% came from the United States of America, 12.3% from Malaysia, 8.23% from the United Kingdom, 5.84% from China and 5.19% from India. Thus, it can be seen that OUM on iTunesU had managed to grab the attention of learners from all corners of the world, from both developing countries and developed nations.



Figure 2 Visitors to OUM on iTunesU by country (8 July to 18 August)

Figure 3 shows the breakdown of visitors by device. Although iPads and iPhones were most popular (83.3% of users), iPads led the way at 56.7%. So, if universities are keen to migrate to the iTunesU platform, it might be worthwhile considering giving learners an iPad each.



Figure 3 Visitors to OUM-iTunesU by device (8 July to 18 August)

The age group of people who visited OUM on iTunesU is shown in Table 3. About 70.7% fall into the 25 to 49 age group category, which indicates that early- to mid-career working professionals are keen to enhance their career paths or explore career change. The implication is that MOOCs which enhance work performance or open new work opportunities are more likely to attract learners. Based on this feedback, short courses related to management and skills-based training were offered.

	Table 3	Breakdown	of visitors	by age grou	up (8 July to	18 August)
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	Visitors by Age
Age Range	Visits
Under 18	0.7%
18-20	4.8%
21-24	10.9%
25-34	36.3%
35-49	34.4%
50-54	7.0%
55 and over	4.4%
Unknown	1.5%

#### 5 Conclusion

To sum up, OUM has made a foray into the MOOC learning environment, and it is the first University in Malaysia to be on iTunesU. To date, the feedback has been positive. Within five weeks, there have been more than 800 downloads from countries round the world. The profile of visitors and material downloaded offers guidelines as to the type of courses to offer as pilot MOOCs, slotted to be launched in November. In the pipeline is a research project to evaluate the impact of these pilot MOOCs. It is hoped that feedback from this upcoming research study will provide new insights on the efficacy of MOOCs in Malaysia, as well as shed light on new ways to improve the MOOC initiative in the country.

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## Studies and Practices for Advancement in Open and Distance Education

The role of open and distance education institutions is evolving, and technology is fast opening up new possibilities and means of teaching and learning.

The articles in this book, which began as selected papers presented during the 28th Annual Conference of the Asian Association of Open Universities (AAOU) held on 28–31 October 2014 at the Open University of Hong Kong, represent contemporary efforts to advance open and distance education at tertiary level.

The articles are grouped into three sub-themes:

- Institutional research in ODL
- Institutional advancement and innovations
- Research and innovative ODL practices

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