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Open Praxis provides immediate open access to content on the principle that making research freely available to the public supports a greater global exchange of knowledge.

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Brief report on *Open Praxis* development

Inés Gil-Jaurena  
*Editor for Open Praxis. Universidad Nacional de Educación a Distancia – UNED (Spain)*  
editor@openpraxis.org

Back in 2011, the editorial project for the relaunching of *Open Praxis* as the ICDE scholarly, peer-reviewed and open access journal included three main aspects: editorial process, scientific quality and dissemination (Gil-Jaurena & Malik, 2011). After three years of regular publication (3 volumes and 12 issues), we would like to highlight what we consider main achievements that provide an overview of the development of *Open Praxis*:

- **Scientific and ethic standards**  
The journal meets all the requirements for scientific publications, both in formal aspects (peer-review, regular publication, metadata, public information, etc.) and ethical aspects, following guidelines provided by COPE (2011) (Gil-Jaurena, 2014a).

- **Global reach and global contributions**  
Visitors and readers represent all regions in the world, and authors and reviewers have an international and institutional balance (Gil-Jaurena, 2015). Journal statistics give credit to different contributors to *Open Praxis*: authors, reviewers, readers (table 1, figure 1).

- **Increased impact, visibility and dissemination**  
*Open Praxis* is present in diverse indexes, databases and catalogues, such as ERIC, ERIH PLUS, DOAJ, ERA, etc. Being an open access, it is easily accessible and receives around 5000 pageviews per month (source: google analytics) (Gil-Jaurena, 2014b). In 2015, *Open Praxis* has been selected for inclusion in the Emerging Sources Citation Index (ESCI), a new index in the Web of Science™ Core Collection launched in November 2015 by Thomson Reuters. All papers published in *Open Praxis* from January 2015 on are now searchable in WoS.

- **Recognition in the field of open and distance education**  
*Open Praxis* is becoming more widely known, and recognized as a reliable and honest journal (Athenas, 2015; Farrow, 2015).

Focusing in 2015, a total of 66 authors (excluding editor) have contributed to volume 7. Contributions are geographically and institutionally balanced, considering the international scope of the journal, with less than 35% contributions from Europe in 2015 (being 50% the maximum stated in the journal policies). Published papers in 2015 had authors from 15 different countries. Also reviewers reflect a geographical and institutional balance, as shown in the list available in *Open Praxis* website ([http://openpraxis.org/index.php/OpenPraxis/pages/view/reviewer](http://openpraxis.org/index.php/OpenPraxis/pages/view/reviewer)). A total of 61 reviewers undertook reviews for volume 7 (table 1).
Table 1: Journal statistics per year

<table>
<thead>
<tr>
<th></th>
<th>2013, volume 5, issues 1–4</th>
<th>2014, volume 6, issues 1–4</th>
<th>2015, volume 7, issues 1–4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issues published</td>
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<td>4</td>
<td>4</td>
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<tr>
<td><strong>Items published</strong></td>
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<td><strong>35</strong></td>
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<tr>
<td>Research papers</td>
<td>21</td>
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<td>13</td>
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<tr>
<td>Innovative practice papers</td>
<td>2</td>
<td>6</td>
<td>3</td>
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<tr>
<td>Special papers (ICDE prizes 2013 and 2015, <em>Open Education Conference</em> selected papers 2014 and 2015)</td>
<td>9</td>
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<td>11</td>
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<tr>
<td>Editorial</td>
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<td>Software or book reviews</td>
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<td>-</td>
<td>2</td>
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<tr>
<td><strong>Total submissions</strong></td>
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<td><strong>52</strong></td>
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<tr>
<td>Rejected before peer-review</td>
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<tr>
<td>Accepted</td>
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<td>Days to publication</td>
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<td><strong>59,61%</strong></td>
<td><strong>50,88%</strong></td>
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<td>71</td>
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<tr>
<td>Average authors per paper</td>
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<td>2,15</td>
</tr>
<tr>
<td>Number of reviewers</td>
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</tr>
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<td>Full paper views (until February 28th 2016)</td>
<td>119227</td>
<td>67569</td>
<td>38064</td>
</tr>
</tbody>
</table>

Regarding visitors and readers, figure 1 shows their location. Since publication of issue 5(1) in January 2013 until December 31st 2015, we have had visits from 188 countries, being the top ten the following (in descending order): United States, Spain, United Kingdom, Canada, India, South Africa, Australia, Palestine, Indonesia and Germany (source: Google Analytics).
Citations to *Open Praxis* in academic publications (scientific journals, conference proceedings, books and other specialized works) have increased since the relaunching of the journal (figure 2). Focusing in the last volumes, *Open Praxis* has had 341 citations to papers published in 2013, 2014 and 2015 (see detail in table 2). *Open Praxis* h-index is 17 (source: Google Scholar).

<table>
<thead>
<tr>
<th>Papers</th>
<th>Volume 5</th>
<th>Volume 6</th>
<th>Volume 7</th>
</tr>
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<td>38</td>
<td>35</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Papers that have received at least one citation</td>
<td>29</td>
<td>20</td>
<td>6</td>
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<tr>
<td>Total citations (until February 28th 2016)</td>
<td>266</td>
<td>65</td>
<td>10</td>
</tr>
</tbody>
</table>
After a brief report on the development of *Open Praxis* since 2012, what follows is an introduction to the first issue in volume 8, which includes four articles in the research papers section and two book reviews.

In the first paper, Melike Aydemir, Engin Kursun and Selcuk Karaman (*Question-Answer Activities in Synchronous Virtual Classrooms in Terms of Interest and Usefulness*) present a research study undertaken in a postgraduate online programme in Turkey. They measured the effect of question type and answer format on perceived interest and usefulness during synchronous class sessions, and concluded that open-ended questions increase learners’ interest, and answer format have an effect on usefulness of online activities. These results are a first approach to a topic of interest both for researchers and practitioners.

Ayesha Perveen (*Synchronous and Asynchronous E-Language Learning: A Case Study at Virtual University of Pakistan*) presents a study developed in three English courses (L2), and focused on identifying best modes for language learning in virtual environments. After collecting learners’ perceptions and opinions, she concludes that blended modes that combine synchronous and asynchronous activities are preferable for English language learners of Virtual University of Pakistan. She provides examples for activities in each modality, useful for second language teachers in distance education.

Krishna Prasad Parajuli (*Mobile Learning Practice In Higher Education in Nepal*) analyses the current status of mobile learning in the Gorkha district of Nepal. Following a conceptual and contextual approach to the topic, he presents survey results about the use of mobile technologies by students and their perceptions about mobile learning. A set of in-depth interviews completes the research, identifying specific mobile practices and trends. The author explains how mobiles are present in Nepal, but not specifically used for learning purposes. He discusses some challenges and recommendations for the implementation of mobile learning in Nepal.

Finally, Sanjaya Mishra, Meenu Sharma, Ramesh Chander Sharma, Alka Singh and Atul Thakur (*Development of a Scale to Measure Faculty Attitude towards Open Educational Resources*), present, in detail, the process of validation of a scale (which is included as an appendix). The instrument is focused on the Attitude towards OER, and measures two dimensions—sharing of resources and adaptation and use of OER—through 17 items. The paper explains the process of development of the scale and the methodological decisions made to design the final scale.


Finally, Dana Bodewes presents a Book review of *The New Digital Shoreline: How Web 2.0 and Millennials are Revolutionizing Higher Education*, a 2011 publication by Roger McHaney.

Special thanks from *Open Praxis* to the authors and reviewers who have contributed to this issue.

**References**


Question-Answer Activities in Synchronous Virtual Classrooms in Terms of Interest and Usefulness

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Abstract
Instructors generally convey their face to face habits to synchronous virtual classrooms, but these face to face strategies do not work in these environments. In this sense, the purpose of this study was to investigate the effects of question type and answer format used in synchronous class implementations on perceived interest and usefulness. To do this, questions were asked in different ways and answers were requested in different formats in synchronous virtual sessions. The participants consisted of 28 postgraduate students registered in an online criminal justice program at a university located in the North-East part of Turkey. Data was collected in the context of a Research Methods in Security Sciences course during 2012–2013 fall semester. Results showed effects of question type on learner interest, while answer format has an effect on usefulness of online activities. In conclusion, to increase interest in synchronous virtual classrooms by asking questions, instead of closed-ended questions, open-ended questions which everybody can answer should be preferred.

Keywords: Synchronous communication, virtual classrooms, question-answer activity, synchronous web-based course, videoconferencing

Introduction
Distance education technologies enable people in different places to interact simultaneously (Kidd & Stamatakis, 2006). The greatest advantage of distance education is the assembly of learners and instructors from different places in a single environment and timeframe without the limitation of place or setting (McBrien, Jones & Cheng, 2009; West & Jones, 2007). Synchronous practices often involve synchronous virtual classrooms, during which instructors conduct lectures via video conferencing. In this way, learners can actively interact with the lecturer, classmates, and the interface (De Freitas & Neumann, 2009). Synchronous class platforms generally include tools that allow for sending messages, sharing files, and posting images and audio, and prompting simultaneous participation (Engle & Parent-Stevens, 1999; McBrien et al., 2009).

Interaction is a very important component of the distance learning environments and its forms are instructor-learner, learner-learner, learner-content, learner-interface forms (Guichon, 2010; Tipton, Pulliam, Allen & Sherwood, 2011). The instructor-learner interaction takes place especially in the synchronous virtual classrooms (Schullo, Hilbelink, Venable & Barron, 2007). In order to increase interaction in synchronous virtual classroom, it is important to employ a variety of techniques (Murphy, Rodriguez-Manzanares & Barbour, 2011). Teaching methods should encourage the interactions between learners and instructors in the synchronous virtual classrooms (Karaman, Aydemir, Kucuk, & Yildirim, 2013). Since teaching methods have an impact on achievement, learner motivation, and attitudes towards a course, these methods should be designed carefully (Karaman, et al., 2013; Marjanovic, 1999; McAlister, Ravenscroft, & Scanlon, 2004; Ng, 2007). Examples of activities that facilitate instructor-learner interaction include role playing, researching, asking and answering questions, discussions, analysis, and small scale projects, either individually or in groups.
(Brade, 2007; Larkin, 2007). The most frequently used method is question and answer activities in synchronous virtual classrooms (Guth & Petrucco, 2008; Tabak & Rampal, 2014; Watkins, 2005).

Questions are a basic component of effective teaching (Bell, 2002; Conderman & Morin, 2002). When properly used, they have the potential to increase learner success (Wilen & Clegg, 1986). Questions may be used to enrich teaching by evaluating knowledge acquisition, creating motivation, attracting attention, solidifying concepts, and assessing understanding (Levin & Nolan, 2004; Bond, 2007). Questioning prompts interaction between instructor and learner and immediately reveals progress and efficiency of learning (Bernstein, 2013; Goossen, 2002). Previous studies have further shown that questioning strategies affect the emotional change of the learner as well as relationships between instructors and learners (Canfield & Wells, 1994; Sun, 2012; Zou, 2004).

The literature has defined several classifications of questions. Jones (1995) analyzed questioning strategies in interactive tele-courses and divided questions into two types, private and discussion. A private question was defined as a question with a single answer according to knowledge level, while a discussion question was open-ended with more than one appropriate answer. Guilford (1956) divided questions into convergent and divergent. Convergent questions generally had one correct answer, as with multiple-choice questions, but divergent questions had many reasonable answers. Meanwhile, Hargreaves (1984) and de Rivera, Girolametto, Greenberg, and Weitzman (2005) classified questions as open- and closed-ended. Hargreaves (1984) defined open-ended questions as requiring high cognitive skills such as inquiry and evaluation; closed-ended questions required lower level skills such as remembering. De Rivera et al. (2005) extended the definition of open-ended questions to include requiring detailed answers, while closed-ended questions required simple, short answers. As all classifications were based on the scope and clarity of the expected answer, Jones’s (1995) private question, Guilford’s (1956) convergent question, and Hargreaves’s (1984) and Riviera et al.’s (2005) open-ended questions all represent the same type of question. Similarly, Jones’s (1995) discussion, Guilford’s (1956) divergent, and Hargreaves’s (1984) and de Rivera et al.’s (2005) closed-ended questions are the same.

One of the major problems in online education environments is the lack of learner-learner and instructor-learner interaction (Kim, 2012; Lee & Choi, 2011). This drawback of online education environments can be partly overcome by synchronous e-learning systems such as BigBlueButton, Adobe Connect or Elluminate (Leidner & Jaryenpaa, 1995; Hrastinski, Keller & Carlsson, 2010). However, this technical solution is not effective alone. Effective learning and interaction can be ensured provided that these solutions are harnessed with appropriate pedagogical activities. One of the traditional mechanisms which trigger interaction is question-answer activities. However, it is shown in the literature that habits in face to face environments do not adequately work in online synchronous environments (Ng, 2007). Therefore, it is necessary to re-design these activities compatible with online synchronous environments and investigate their effects (Karaman et. al, 2013). So in general we need online pedagogies to increase instructor and learner interaction in online education environments (Repman, Zinskie & Carlson, 2005) and specifically it is necessary to investigate how to use question and answer at synchronous learning environments (Kato, White, Teevan & Dumais, 2013).

Since distance education is becoming more and more synchronous class oriented to increase interaction (Martin & Parker, 2014), widespread effects of the results of this study are likely to be useful. The findings of this study will be directive in planning, practicing, and evaluating question-answer activities for synchronous class practices. In this sense, the main purpose of this study was to investigate the effects of question type (open- or closed-ended) and answer format (the quickest or all) used in synchronous class implementations on learners’ perceptions of interest and usefulness. Two research questions guided the study:

Open Praxis, vol. 8 issue 1, January–March 2016, pp. 9–19
1. Do question type (closed- and open-ended) and answer format (the quickest and all answers) affect learners' perceptions in terms of interest?

2. Do question type (closed- and open-ended) and answer format (the quickest and all answers) affect learners' perceptions in terms of usefulness?

**Methods**

**Research Design**

Repeated measures factorial design was used in this research. Repeated measures factorial design is used to determine interactions between independent variables that have multiple measurements and unique effects due to each independent variable (Ellis, 1999; Cohen & Cohen, 1983; Minke, 1997). Therefore, a 2x2 (closed-ended and open-ended X the quickest answer and all learner answer) repeated measures factorial design was used to analyze each subject for each score of the combinations of the factors by measuring at different times (Huck & Cormier, 1996).

**Samples**

Samples consisted of 28 postgraduate students studying at a distance education center serving the East Anatolia Region of Turkey. The students participated in a synchronous virtual classroom of Research Methods in Security Sciences course for five weeks. In this study, purposeful sampling method was used. Their ages ranged from 35 to 40, and all of them were employed in addition to taking classes. Before the study, the learners had all taken distance education classes for at least one year and had previously attended synchronous virtual classrooms. Question and answer activities were carried out within synchronous class sessions of the Research Methods in Security Sciences course. This course was designed to equip master’s students with basic principles of research methods in security sciences and demonstrate how scientific studies should be conducted.

**Data collection instrument**

An experiment was conducted for five weeks to see the ongoing effects of question-answer activities in terms of perceived interest and usefulness levels according to question type and answer format. At the end of each session students were surveyed about their reactions to the questions and whether the questions promoted their engagement with the subject matter. They scored each question and answer activity on a scale of 1 to 5 in terms of interest and usefulness.

**Independent variables**

Question type and answer format served as independent variables in this study. Question type variables were closed-ended and open-ended. Similarly, answer format variables were the quickest answer and all learner answers. Question type was determined by information covered in the question and the expected answer. Generally, closed-ended questions have a single correct answer. Closed-ended questions cover skills at the level of knowledge and comprehension, such as simple remembering, whereas open-ended questions may have multiple answers. Open-ended question requires analysis and synthesis, such as associating multiple pieces of information, expressing information in various ways, and applying knowledge to different situations. “What are non-scientific research methods?” is an example of a closed-ended question; “What are the basic differences between the perspectives of qualitative and quantitative research methods on research?” is an open-ended question.
Answer format served as another independent variable, as either the quickest answer or all learner answers. Answer format can be regarded as the strategy followed by learners after a question is asked. When learners were asked for the quickest answer, the answer taking process ended after receiving four or five answers. After asking questions, the instructor said: “Who will give the quickest answer?” For all learner answers, each participant was expected to give an answer, and the process ended when approximately 70% of participants answered the question. After asking questions, the instructor said: “Everyone must answer this question”.

**Dependent variables**

Levels of interest and usefulness towards question type and answer format were dependent variables in this study. Learners were asked to rate the answer format of each question for interest and usefulness during activities in synchronous classes. Levels ranged from 1 to 5. The survey was completed weekly after synchronous classes, and responses were recorded.

**Procedure**

This study was conducted in an online criminal justice postgraduate program in a university’s distance education application and research center located north-east part of the Turkey. The study was conducted during the 2012–2013 fall semester. The instructor asked a question during the synchronous class session of research methods in the criminal and justice course, and participants wrote responses in chat. Questions were prepared according to course material and directed learners in line with answer formats. A total of 20 question-answer activities were carried out over five weeks, and 290 written responses were collected. Questions were separately prepared and approved by the instructor each week before being asked. As seen in Figure 1, four questions were asked each week for five weeks. Each week, both types of question were used. A single group of learners were asked to rate each activity on a scale of 1 to 5 in terms of interest and usefulness.

<table>
<thead>
<tr>
<th>Group</th>
<th>1st Week</th>
<th>2nd Week</th>
<th>3rd Week</th>
<th>4th Week</th>
<th>5th Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>A B C D</td>
<td>A B C D</td>
<td>A B C D</td>
<td>A B C D</td>
<td>A B C D</td>
<td>A B C D</td>
</tr>
<tr>
<td>Survey</td>
<td>Survey</td>
<td>Survey</td>
<td>Survey</td>
<td>Survey</td>
<td>Survey</td>
</tr>
</tbody>
</table>

**Figure 1: Implementation process**

*Note: A: closed-ended question, the quickest answer; B: closed-ended question, all learner answers; C: open-ended question, the quickest answer; D: open-ended question, all learner answers*

Question types were closed- and open-ended, while answer formats were the quickest and all learner answers. During five weeks of the course, each question type and answer format was matched, leading to four questions being asked. Table 1 summarizes each question-answer activity.

**Table 1: Structure of question-answer activities**

<table>
<thead>
<tr>
<th>Question type</th>
<th>Answer format</th>
</tr>
</thead>
<tbody>
<tr>
<td>The quickest answer</td>
<td>All learner answers</td>
</tr>
<tr>
<td>Closed-ended</td>
<td>Question-answer activity 1</td>
</tr>
<tr>
<td>Open-ended</td>
<td>Question-answer activity 3</td>
</tr>
</tbody>
</table>
**Context**

Different web conferencing applications such as Adobe Connect, Blackboard Collaborate, WebEx, and GoToMeeting were used for synchronous virtual classrooms (Moore & Quintanilla, 2013). In this study, Adobe Connect platform—which is enterprise web conferencing software—was used. These kinds of platforms enable learner-instructor, learner-learner and learner-content interaction without place limitation. It enables real-time meetings that students can access via a web-browser. It includes features such as file, presentation and screen sharing, chat, audio and video conversation, and whiteboard. Meeting workspaces are organized in parts. These parts include screen share, chat, webcam etc. By using these features and parts, synchronous virtual classroom was held by the instructor. A screenshot of a synchronous class session can be seen in Figure 2. The layout includes chat, attendee list, webcam and sharing parts (Figure 2).

![Figure 2: A screenshot of a synchronous class session](image)

The instructor shared the lecture notes, the presentations and the other materials in sharing part. Attendee list includes instructor’s and students’ names. Questions were directed to students by using the chat area. There is an instructor and students’ camera recording in webcam part. Students were able to reply to the questions in the chat and whoever wanted could answer first. During the sessions, instructors and students were supported in terms of the usage of the software by the technical staff. All sessions were recorded with the help of the software as a video for later use. Synchronous virtual classrooms were also recorded and uploaded to the learning management system for the students who could not attend this session or who wanted to watch the lecture again.

**Data Analysis**

As indicated previously, this study had two independent variables, question type and answer format, and two dependent variables, perceived interest and usefulness scores. Within the scope of the research questions, the data was analyzed first by descriptive statistical methods and then by two-way ANOVA because there are two independent variables (question type and answer format) and each variable has two levels (question type: open-ended and closed-ended; answer format: the quickest and all learner answer). This approach allowed for consideration of the interaction between the independent and dependent variables.
Results

The Effect of Question Type and Answer Format on Perceived Interest

In order to determine the effects of question type and answer format, different combinations were directed to learners. Average and standard deviation values of learner interest scores regarding the questions type and answer format are shown in Table 2.

Table 2: Interest scores for question type and answer format

<table>
<thead>
<tr>
<th>Question type and answer format</th>
<th>N</th>
<th>(\bar{X} )</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-ended question – All learner answers</td>
<td>96</td>
<td>4.50</td>
<td>.858</td>
</tr>
<tr>
<td>Open-ended question – The quickest answer</td>
<td>96</td>
<td>4.47</td>
<td>.973</td>
</tr>
<tr>
<td>Closed-ended question – The quickest answer</td>
<td>96</td>
<td>4.31</td>
<td>.910</td>
</tr>
<tr>
<td>Closed-ended question – All learner answers</td>
<td>96</td>
<td>4.31</td>
<td>.955</td>
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</tbody>
</table>

As shown in Table 2, all learner answers in reply to open-ended questions drew the most attention (\(\bar{X} = 4.50\)), followed by open-ended questions with the quickest answers (\(\bar{X} = 4.47\)), closed-ended questions with all learner answers (\(\bar{X} = 4.31\)), and closed-ended questions with the quickest answers (\(\bar{X} = 4.31\)). Open-ended questions were, therefore, relatively more interesting than closed-ended questions. As for answer format, the all learner answer format was more attractive than the quickest answer format.

Two-way ANOVA was administered to understand the difference in interest scores (see Table 3). As a result of the analysis, it was detected that the effect of question type on interest scores was significant (\(F_{(94)} = 47.105, p < .05, \eta^2_p = .026\)). However, this effect was rather low. On the other hand, the difference in answer format for interest score was insignificant (\(F_{(94)} = 0.671, p > .05\)). In addition, question type and answer format did not have an interaction effect on interest score (\(F_{(94)} = 0.000, p > .05\)).

Table 3: The effect of question type and answer format on interest

<table>
<thead>
<tr>
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<th>p</th>
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<td>88.624</td>
<td>0.671</td>
<td>.413</td>
</tr>
<tr>
<td>Question Type and Answer Format</td>
<td>1</td>
<td>0.015</td>
<td>0.000</td>
<td>.991</td>
</tr>
</tbody>
</table>

The Effect of Question Type and Answer Format on Perceived Usefulness

The average and standard deviation values for each factor of question type and answer format regarding usefulness were calculated and are presented in Table 4. Closed-ended/all answers (\(\bar{X} = 4.56\)) and open-ended/all answers (\(\bar{X} = 4.56\)) were determined as most useful; they were followed by open-ended/the quickest answer (\(\bar{X} = 4.54\)) and closed-ended/the quickest answer (\(\bar{X} = 4.47\)) pairs.
Table 4: Usefulness scores of question type and answer format

<table>
<thead>
<tr>
<th>Question type and answer format</th>
<th>N</th>
<th>( \bar{X} )</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-ended – All learner answers</td>
<td>96</td>
<td>4.56</td>
<td>.723</td>
</tr>
<tr>
<td>Open-ended - All learner answers</td>
<td>96</td>
<td>4.56</td>
<td>.805</td>
</tr>
<tr>
<td>Open-ended- The quickest answer</td>
<td>96</td>
<td>4.54</td>
<td>.882</td>
</tr>
<tr>
<td>Closed-ended – The quickest answer</td>
<td>96</td>
<td>4.47</td>
<td>.882</td>
</tr>
</tbody>
</table>

Two-way ANOVA analysis results indicated that answer format had an effect on usefulness \( (F_{(94)} = 6.155, p < .05, \eta^2_p = .004) \); however, this effect was rather low. Results (table 5) showed that question type had no effect on usefulness \( (F_{(94)} = 3.798, p > .05, \eta^2_p = .002) \). Question type and answer format also did not have an effect on usefulness scores when taken together \( (F_{(94)} = 2.271, p > .05, \eta^2_p = .002) \).

Table 5: The effect of question type and answer format on usefulness

<table>
<thead>
<tr>
<th>Measurements</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question type</td>
<td>1</td>
<td>555.814</td>
<td>3.798</td>
<td>.051</td>
</tr>
<tr>
<td>Answer format</td>
<td>1</td>
<td>900.895</td>
<td>6.155</td>
<td>.013</td>
</tr>
<tr>
<td>Question type and answer format</td>
<td>1</td>
<td>398.235</td>
<td>2.271</td>
<td>.099</td>
</tr>
</tbody>
</table>

Discussion

Results revealed that asking both open- and closed-ended questions to learners during synchronous class sessions changed their interest; with open-ended questions increasing interest the most. However, the answer format—“Who will give the quickest answer?” versus “Everyone must answer this”—did not create a difference in terms of raising interest. There was also no interaction effect of question type and answer format on interest.

Some reasons learners may pay more attention to open-ended questions include the concepts that this type of question (a) does not have a single correct answer (Goossen, 2002), so this encourages the person (Sobell & Sobell, 2008), and (b) may be answerable in part, if not known in full (Rogers, 1972; Lee, Kinzie & Whittaker, 2012). Also, since closed-ended questions have a single answer (Rogers, 1972; Lee et al., 2012), while open-ended questions seek multiple perspectives (Wragg & Brown, 2001; Jelly, 2001; Lee et al., 2012), open-ended questions might encourage learners to contribute more. Having only one right answer might increase anxiety about making mistakes. On the other hand, responses given to open-ended questions are unique and represent individual ideas (Lee et al., 2012), potentially increasing interest. An open-ended question can be related to personal thoughts and experiences, and open-ended questions allow respondents to select what pieces of information to provide after evaluating the opinions elicited by the response.

Since closed-ended questions require a structured answer (Tekin, 1991), the learner might not wish to answer, even when the answer is easy. On the other hand, with open-ended questions, both those who know a little and those who know a lot can give responses. Proper difficulty level is one of the most important factors for motivation in learning (Leng, 2006; Lieb 1991; Thorns 2001).
A question may often be either too easy or too difficult, especially a closed-ended question with its single correct answer. Yet, open-ended questions are appropriate for every person's reasoning level, since the quality, extent, and length of an answer is left to the respondent's preference (Çepni, et al., 2012).

According to findings, the questions were generally regarded as useful. This finding can be explained by the value of learner interaction, reviewing and confirming one's own knowledge, and correcting mistakes (Almeida, 2012; Goossen, 2002; Maloney, 2012). Though there was no significant difference between question types according to usefulness scores, answer format did change the perception of usefulness. Rather than the quickest answer, all learner answers were perceived as more useful. While only a few learners respond for the quickest answer, all learner answers require participation from nearly everyone, leading to a feeling of obligation to interact and prompting all students to experience the process and envision it in their minds (Goossen, 2012; Maloney, 2012). With the quickest answer format, an individual may feel relieved from the responsibility of answering, and the reasoning process may not occur. If the responsibility of carrying out a task is clearly assigned to a person, the task may be found more useful since the learner is likely to engage in it more.

In conclusion, this study dealt with question type and answer format in terms of interest and usefulness in online synchronous learning environments. Results showed effects of question type on learner interest, while answer format has an effect on usefulness of online activities. To increase interest in synchronous virtual classrooms by asking questions, open-ended questions, which everybody can answer, should be preferred, instead of closed-ended questions. On the other side, it is observed that asking questions which every student in synchronous virtual classrooms can answer is more useful, but when students were requested to give the quickest answer, open ended questions were more appropriate.

The results can be a guiding source for investigating and evaluating usefulness and interest levels of question type and answer format involved in question-answer activities in educational environments. However, the demographics and number of the subjects should be considered while interpreting results. In this sense, diversifying question type and answer format as well as investigating in terms of achievement, motivation, performance, and satisfaction are suggested for future studies.

References


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Synchronous and Asynchronous E-Language Learning: A Case Study of Virtual University of Pakistan

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Abstract
This case study evaluated the impact of synchronous and asynchronous E-Language Learning activities (ELL-tivities) in an E-Language Learning Environment (ELLE) at Virtual University of Pakistan. The purpose of the study was to assess e-language learning analytics based on the constructivist approach of collaborative construction of knowledge. The courses selected for random sampling were English Comprehension (Eng101), Business & Technical English (Eng201) and Business Communication (Eng301). Three methods were employed to collect the data: observation of the communication and performance on given channels, students’ opinions on Graded Discussion Board (GDB), and a survey questionnaire. Out of a total population of 9919, 1025 responses were received for the survey questionnaire. The findings revealed that asynchronous e-language learning was quite beneficial for second language (L2) learners, but with some limitations which could be scaffolded by synchronous sessions. Based on the findings, the researcher suggested a blend of both synchronous and asynchronous paradigms to create an ideal environment for e-language learning in Pakistan.

Keywords: E-Language Learning Environment, E-Language Learning activities, constructivism, asynchronous communication, synchronous communication, second language learning

Introduction

We shape our tools, and thereafter our tools shape us (McLuhan, 1995, p. ix)

Online learning environments can be divided into a triad of synchronous, asynchronous and hybrid learning environments. Synchronous learning environments provide real time interaction, which can be collaborative in nature incorporating e-tivities (Salmon, 2013) such as an instructor’s lecture with a facility of questions-answer session. However, a synchronous session requires simultaneous student-teacher presence. On the other hand, asynchronous environments are not time bound and students can work on e-tivities on their own pace. A hybrid online environment blends synchronous sessions with asynchronous set of e-tivities. It can be called hybrid as it combines simultaneity with non-simultaneity as instructional design for both synchronous and asynchronous teaching may have altogether different patterns. A study by Karen Swan (2001) maps learners’ satisfaction and perceived learning in an asynchronous mode. She finds clarity of design, interaction with instructors, and active discussions among course participants as key factors of students’ satisfaction and perceived learning. Mc Brien, Cheng and Jones (2009) analyze the impact of synchronous sessions on students’ learning and find it a good way of reducing distance in distance education. It is important to know how students perceive their learning behavior in both media (Somenarain, Akkaraju & Gharbaran, 2010). Based on students’ perceptions and learning analytics (Greller & Drachsler, 2012), this paper discusses the strengths and weaknesses of the two paradigms in general and with reference to English language learning/teaching in particular. The case study in this regard is Virtual University of Pakistan (VUP), with its twelve years of e-learning experience.
Asynchronous E-Learning

An asynchronous mode of learning/teaching has been the most prevalent form of online teaching so far because of its flexible modus operandi (Hrastinski, 2008). Asynchronous environments provide students with readily available material in the form of audio/video lectures, handouts, articles and power point presentations. This material is accessible anytime anywhere via Learning Management System (LMS) or other channels of the sort. LMS is a set of tools that houses course content and provides a framework for communication between students and teachers like a classroom. Other terms sometimes used instead of LMS are Course Management System (CMS) and Virtual Learning Environment (VLE). CMS is comparatively an older term and its usage is less common today as it implies basic management of course content, while LMS indicates the system that supports the learning process. The term VLE also implies the support of the learning process, but it is more frequently used to describe systems that support blended learning environment (Watson, Gemin, Ryan & Wicks, 2009). Some institutions develop their own LMS; others either utilize an open source or purchase an LMS. The case study in this paper, Virtual University of Pakistan, has developed its own LMS to provide a virtual learning environment to students.

Asynchronous e-learning is the most adopted method for online education (Parsad & Lewis, 2008) because learners are not time bound and can respond at their leisure. The opportunity of delayed response allows them to use their higher order learning skills as they can keep thinking about a problem for an extended time period and may develop divergent thinking. The spontaneity of expression is replaced by a constructed response. Therefore, asynchronous space leads to a self-paced, independent, student-centered learning (Murphy, Rodríguez-Manzanares & Barbour, 2011). Hence, asynchronous e-learning can scaffold students' previous knowledge with new concepts (Lin, Hong & Lawrenz, 2012). Less reliance on memory and notes and more opportunity of discussions with peer groups help build critical thinking and deep learning (Huang & Hsiao, 2012). Shyness is reduced due to the distance mode, which alleviates the fear of the teacher. As there is less pressure than a real time encounter, the affective filter remains low and learners can respond more innovatively and creatively. The chances of getting irritated by technological problems—like low speed and non-connectivity—are the least, as ample time to attempt e-tivities is available.

Asynchronous e-learning can be challenging as only a carefully devised set of strategies can keep students engaged and interested in this sort of learning environment to facilitate motivation, confidence, participation, problem solving, analytical and higher order thinking skills. Moreover, it is a self-paced system in which the students have to be self-disciplined to keep themselves active as well as interactive to keep track of e-tivities. Whereas discussions on forums and blogs can keep them active, going off topics can also distract them. Delayed feedback can be another frustrating factor (Huang & Hsiao, 2012). Moreover, there are insufficient opportunities for socializing and students have to look for ways of networking themselves.

Synchronous E-Learning

Synchronous e-learning, on the other hand, refers to learning/teaching that takes place simultaneously via an electronic mode. Synchronous voice or text chat rooms provide an opportunity of teacher-student and student-student interaction. Apart from chat, video-conferencing facilitates face-to-face communication. Web conferences through surveys, polls and question-answer sessions can turn out to be more interactive than video conferencing.

Synchronous mode instills a sense of community through collaborative learning (Teng, Chen, Kinshuk & Leo, 2012; Asodar, Atai, Vaezi & Marandi, 2014). A synchronous virtual classroom is a place for instructors and students to interact and collaborate in real time. Using webcams and class
discussion features, it resembles the traditional classroom, except that all participants access it remotely via the Internet. Lessons can be recorded and added to an e-library. Using the archived e-library, students can access and replay teacher’s lectures as many times as necessary to master the material. Direct interaction with teachers and students in real time is very much like a traditional face-to-face classroom, rather better, as distance is no more a barrier and by connectivity via the Internet no time is wasted in traveling. etc. Synchronous sessions can result in high levels of motivation to stay engaged in e-tivities due to teacher and class-fellows presence (Yamagata-Lynch, 2014). Instant feedback and answers can help students resolve any problems they encounter in learning. Facial expressions and tones of voice can aid them to have the human feel at a broader spectrum and lead to global interaction without much cost.

Some of the challenges of synchronous education can be the need of the availability of students at a given time and the necessary availability of a good bandwidth Internet. Participants can feel frustrated and thwarted due to technical problems. In addition, a carefully devised instructional design is required as pedagogy is more important than technologically facilitated media. For example, Murphy et al. (2011) consider synchronous mode more teacher-oriented. Special e-tivities need to be created to broaden the scope of synchronous communication from a lecture or teacher-student discussion only.

Language Learning in Asynchronous and Synchronous Modes

Broadly speaking, effective learning refers to strengthening the relationship between learning processes of collaboration, interaction, participation and responsibility, and learning objectives and outcomes like problem solving skills, critical thinking and higher order thinking (Watkins, Carnell, Lodge & Whalley, 1996). Therefore, the design and implementation of any e-language learning pedagogy should provide maximum support to students for achieving objectives and outcomes to avoid frustration (McCloskey, Thrush, Wilson-Patton & Kleskova, 2013), especially in comparison to traditional face-to-face language learning process which provides a real time interaction, immediate feedback and a feel of human touch. This can be achieved by creating a context of language learning through collaboration as a communicative approach of language teaching to encourage group e-tivities and social construction of language through interaction with a shift of focus from teacher-centered pedagogy to learner autonomy (Borg & Al-Busaidi, 2012). The researcher has coined a new term ‘Elltivity’ (E-language learning activity) for any e-tivity devised for an online language classroom in general and second language (L2) classroom in particular.

Online learning facilitates a multiplicity of language learning styles. A community of inquiry model (Garrison, Anderson & Archer, 1999) with a teacher, cognitive and social presence can be a great aid to both a/synchronous language learning. A conversational framework for direct communication (Laurrilard, 2013) based on question-answer mode and direct feedback from teacher can be facilitated through synchronous mode. However, a teacher’s observation is not sufficient unless we get to know how learners wish to learn what they want to learn (West, 1994). Therefore, the first step in designing any language course is students’ needs analysis (Johns, 1991). The needs analysis should be pedagogic (West, 1994) as well as psychological and social (Seedhouse, 1995) to achieve successful communication in a target situation (Chambers, 1980). With reference to online learning, students must be aware about the environment in which they learn a language. Students’ comfort with synchronous and asynchronous E-Language Learning Environments (ELLE) is important because the language learning styles and strategies as well as teaching methods that work well in one paradigm may not be equally fruitful in the other (Dudley-Evan & St Jones, 1998). Online language teachers should strive to design environmentally sensitive courses (Jordan, 1997), which
can lead to a carefully devised instructional design based on technological pedagogic content knowledge (Koehler & Mishra, 2005). Technological pedagogical content design is a time taking process, as it needs a deep understanding of the relationship between content, pedagogy, technology and the context where it would be operational (Koehler, Mishra & Yahya, 2007). A careful analysis of the perception of language learners about the environment they learn language in and the context it creates for them is significant for facilitating them with a better ELLE.

Asynchronous e-language learning facilitates students from myriad backgrounds and different levels of L2 skills to formulate syntactically and semantically correct sentences by writing and re-writing them for either writing emails or posting discussion comments. This provides them an opportunity of revising their sentences for correctness. The peer pressure of their questions/comments being openly available to be read by their fellow students and teachers helps them work on better formulations of statements. The answers help develop understanding of the concepts (McLoughlin & Lee, 2010a). Moreover, they have ample time to attempt Elltivities, revise their texts or even seek guidance about their writings before uploading them.

Synchronous e-language learning allows them to listen to their teachers providing them an exposure to native/non-native listening input. Simultaneously they get direct feedback for their error analysis, which can lead to conscious language learning or meta-learning. Written presentations by the teacher provide necessary pressure to read and comprehend immediately, as well as writing in chat box leads to immediate construction of sentences to be monitored by the teacher or fellow students. As learner anxiety can have adverse effect on L2 learning progress, learners’ emotional behavior must be kept in mind while designing Elltivities for a synchronous session (Chen & Lee, 2011).

Establishing the current practices of synchronous and asynchronous e-learning/teaching in English language, this study evaluates the effectiveness of a/synchronous environments towards better English language learning at Virtual University of Pakistan (VUP). There are three choices: first, the continuation of the asynchronous model; second, switching to a totally synchronous model, and third, to strive towards a perfect blend of the two. Researches show that learners often prefer a blend of a/synchronous e-language learning (Pérez, 2013), as it can better cater their multiple needs and facilitate in enhancing their capabilities to learn L1 or L2. VUP has been using asynchronous model for language teaching since its inception. The synchronous mode was introduced in 2013 and this paper evaluates the strengths and weaknesses of a/synchronous contexts for English language teaching/learning.

This paper aims to address the following research questions:

Q1. What is the perception of language learners about different a/synchronous Elltivities used in a virtual learning environment?
Q2. Do asynchronous Elltivities facilitate language learning or hinder the process?
Q3. Can an asynchronous pedagogical model be totally replaced by a synchronous model or a blend of the two better facilitates language learning?

Literature Review

*Teaching presence must be as concerned with cognitive development as with a positive learning environment, and it must see content, cognition, and context as integral parts of the whole* (Garrison & Anderson, 2003, p. 69)

Innovations in electronic or virtual learning have also affected language learning and teaching (Martín-Blas & Serrano-Fernández, 2009). Second Language Acquisition (SLA) is a multifaceted
process that occurs spontaneously in communicative situations. SLA is generally considered a conscious, knowledge-accumulating process that usually takes place through formal education (Bialystok & Hakuta, 1999). Online learning can be an ideal medium for language learning because of its potential to utilize multiple teaching methods, strategies and learning styles.

Howard Gardner (2011) challenges any educational system that provides same pedagogical design, i.e., same content and method of teaching to all students. Students have multiple intelligences. Each may have a different cognitive approach to learning and the learning style may vary from visual-spatial to kinesthetic, musical to interpersonal or intrapersonal and linguistic to logical mathematical (Gardner, 2011). To cater multiple and unique learning styles of students, a pedagogy of multiliteracy is required (Guth & Helm, 2012). Online learning environments provide a room for multiliteracy because of multiple ways of communication through multiple media connected to a multiple world in a multiple ways (Stein & Newfield, 2006). This expanding landscape of learning is all the more important for English language learning, which has gained the status of an international or global language (Crystal, 2012), because online learning provides a global context for teaching English as a second language (TESL). ELLE has the potential to move from Grammar Translation to Audio-lingual methods or from The Silent Way and Suggestopedia to The Communicative Way (Larsen-Freeman & Anderson, 2013). The potential to utilize them all leads to a principled eclectic approach (Mellow, 2002), which is pluralistic in nature leading to the timely use of any method based on needs analysis.

Asynchronous e-learning can incorporate all L2 teaching methods that allow for delayed feedback and delayed response as in emails and discussion boards. Asynchronous language learning can be more encouraging for learners to ask questions that require long answers (AbuSeileek & Qatawneh, 2013). Written nature of communication allows greater opportunity to reflect and express ideas more freely than in face-to-face oral communication. Learners get ample time to reflect on other students’ language expression and can compose their own by careful design and improvement for precision. Written exchange of communication can also be useful for those students who do not actively participate in written discussions and remain passive readers. Forum discussions can be helpful in discourse development for timid students due to the anonymity of identity (Maclntyre, Clément, Dörnyei & Noels, 1988). However, asynchronous mode has its disadvantages in reducing direct feedback and immediate interaction.

Synchronous language learning is closer to the communicative way of language teaching/learning with whiteboards, video chat or voice chat providing immediate feedback to help students improve their language skills. Thus, it can duplicate the face-to-face real time classroom (Keegan et al., 2005). The familiarity of the classroom model, immediate feedback from teacher and fellow students and creating contents quickly in the classroom are the hallmarks of a synchronous language-learning environment. Synchronous net-based discourses can improve understanding of complex subject matters (Pfister, 2005) and, as a result, non-native English speakers can outperform face-to-face language. However, it can be problematic for students due to being time bound and the availability of technology on a scheduled time.

Both a/synchronous modes can be beneficial for language learning (Pérez, 2013). A blend of the two models can give students an opportunity to better learn than any of the individual models. A/synchronous modes can complement each other in teaching/learning language through the conversational framework (Laurillard, 2007) and constructivist approaches of creating meaning through dialogue, reflection and experience (Reynolds, Wang & Poor, 2002). When blended, they can provide a wonderful model for enhancing language learners’ cognitive participation, information processing and motivation (Ge, 2011). Language learning is more of a skill-oriented process rather than content mastery. To develop listening and speaking skills, recurrent synchronous sessions are
required (Wang & Chen, 2009). As most of online students work and study simultaneously, asynchronous mode is more appropriate (Mcloughlin & Lee, 2010b) to avoid anxiety resulting from being time bound in synchronous sessions (Guichon, 2010). Most of the studies related to a/synchronous media have explored students’ performance and level of engagement so far; however, the context of learning is mostly ignored, especially with reference to EFL/ESL learners (Yang, 2011). It is important to learn students’ perceptions about the impact of synchronous and asynchronous sessions on their behavior to improve online learner-centered language pedagogy (Sun, 2011).

Method
To evaluate the effectiveness of asynchronous mode, three methods were used to triangulate data: first, the overall observation of the participation of a/synchronous Elltivities in Fall 2013 semester; second, the collection of students’ opinions via a structured questionnaire about a/synchronous modes for learning language; and third, their discussion about the preference of a/synchronous modes on the Graded Discussion Board (GDB).

The usual mode of Elltivities in VUP remained asynchronous with students’-instructors communication via emails, Moderated Discussion Board (MDB); and their assessment was based on Elltivities through assignments, GDB and exams (Figure 1).

Participants in this study consisted of three classes at VUP: English Comprehension (Eng101), Business and Technical English (Eng201) and Business Communication (Eng301). The observation of communication and performance lasted for one semester (Fall 2013) of approximately 5 months. To conduct this study two synchronous sessions were conducted in all three courses, one before the midterm and the other one after the midterm. The number of active students in Eng 101 was (N=4248), in Eng 201 (N=3906) and in Eng 301 (N=1765). Although the study is qualitative, as much data as possible was collected via a survey questionnaire and opinions of the students posted on Graded Discussion Board (GDB) for an in-depth understanding (Polkinghorne, 2005). As a result, 1816 opinions in Eng 101, 1993 in Eng 201 and 816 in Eng 301 were posted on GDB, which makes a total of 4625 posts out of the total population mentioned above.

To reinforce the observations of the researcher about students’ response to a/synchronous Elltivities, a survey was conducted via a questionnaire that was filled by (N=1025) students from all over Pakistan. The question items were developed based on the researcher’s observation of E-Language Learning Environment (ELLE). The questionnaire consisted of 20 questions; both open and close-ended questions were included in the survey to gain maximum insight about students’ experiences in ELLE. The questionnaire data was collected over the semester. The respondents’ response was overwhelming.

Demographic Details of the Sample
The demographic details of the students were collected in the first five questions. The first question identified gender. The total number of participants in the questionnaire was 1025, out of which 644 -i.e. 64%- were male and 362 -i.e. 36%- were female. The second question helped gather data about the age group of students. 854 students -i.e. 84%- were 17–30 years and 138 -i.e. 14%- were 31–40 years. Most of the active students belonged to the 17–30 years age group i.e., young adults. The third question collected details about the province they belonged to. 78% of the students were from Punjab and 9% (n=93) from Sindh. Question four collected data about their academic qualification. A total of 53% were bachelor degree holders, 23% Master degree holders, 23%
Intermediate, 4 MS and 1 PhD. The findings revealed that majority of respondents had completed bachelors. The fifth question referred to the working/non-working status of students. 387 participants -i.e. 41% - were almost always and currently employed, 29% (n=279) were almost always unemployed, and 21% (n=200) were occasionally employed. So most of the enrolled students were employed.
Results

The major focus of the questionnaire was to collect students’ opinion about the usefulness of a/synchronous modes for English language learning based on their experiences in the semester Fall 2013. Following is the description of their responses.

Awareness about A/Synchronous E-Language Learning

Questions 6 and 7 referred to students’ awareness about a/synchronous e-language learning.

![Figure 2: Awareness about a/synchronous e-learning](image)

The visual graphics in Figure 2 show that 630 participants -i.e. 62%- were aware about asynchronous e-learning whereas 380 -i.e. 37%- were not aware of the term asynchronous e-learning, and 640 participants -i.e. 64%- were aware about synchronous e-learning whereas 358 -i.e. 36%- were not familiar with the term synchronous e-learning.

A total of 64% and 62% of participants were well aware of synchronous and asynchronous modes of language learning respectively.

English Language Learning in A/Synchronous Modes

Questions 8 and 9 were close-ended question seeking participants’ opinion whether English language could be better learnt a/synchronously or not.
578 participants -i.e. 57%- were positive about asynchronous e-language learning whereas 429 -i.e. 43%- were not in favor of asynchronous e-learning (Figure 3). 824 participants -i.e. 82%- were in favor of synchronous mode of language learning whereas 182 -i.e. 18%- were not in its favor.

**Desirable Duration of a Synchronous Session**

Already one-hour synchronous sessions were conducted during the semester, so the students were asked in the next question about the desirable duration of the session. Four options were given in this regard: 20, 30, 40 and 50 minutes.

Figure 4 shows that 343 -i.e. 33%- were in favor of a 30 minutes synchronous session; 255 -i.e. 25%- were in favor of a 40 minute session and 199 -i.e. 19%- were in favor of a 20 minute session. The results show that most of the participants were in favor of a 30 minutes session.
Most Helpful Asynchronous Activity for Language Learning

Question 11 asked about the most helpful activity in asynchronous mode of language learning. ‘Email’, ‘GDB’, ‘MDB’, ‘Quiz’ and ‘assignments’ options were given, along with ‘all of the above’ and ‘none of the above’ options. They were also given the option to give any other comments. The results are given in Figure 5:

![Figure 5: The most helpful activity in asynchronous e-language learning](image)

A total of 572 participants -i.e. 56%- found all Elltivities to be helpful in asynchronous language learning whereas 129 -i.e. 13%- found assignments as the most helpful activity in asynchronous mode.

Active Participation in a Synchronous Session

Question 12 asked about students’ active participation in synchronous sessions.

![Figure 6: Active participation in a synchronous session](image)
Figure 6 shows that 67% (n=691) did not participate in the synchronous activity and 33% (n=334) participated in it. So most participants did not attend the synchronous sessions.

Question 13 asked whether synchronous activities helped them improve their English and 62% agreed whereas 38% disagreed (Figure 7).

**Strengths and Weaknesses of Asynchronous E-Language Learning**

Question 14 sought participants’ opinion about the strongest point of asynchronous e-language learning. They were given the options of ‘not time bound’, ‘not place bound’, ‘allows time to reflect’, ‘written responses’ and they could choose all or none of the above, as well as give any additional remarks.

Figure 8: The strongest features of asynchronous e-language learning
Figure 8 shows the description of the strongest points of asynchronous e-language learning. A total of 567 participants -i.e. 55%- considered all options as the strong points of asynchronous e-language learning and 199 -i.e. 19%- pointed out that the best aspect was that asynchronous e-language learning was ‘not time bound’.

The greatest weakness of asynchronous language learning was explored by question 15. Apart from all of the above, none of the above and any other, the options given were ‘no face to face interaction with the teacher’ and ‘no simultaneous answers’. The results are shown in Figure 9.

![Figure 9: The greatest weakness of asynchronous e-language learning](image)

43% chose ‘all of the above’ option whereas 34% considered ‘no face to face interaction with teacher’ as the greatest weakness.

**Strengths and Weaknesses of Synchronous E-Language Learning**

Question 16 asked about the greatest strength of synchronous e-language learning (Figure 10).

![Figure 10: The greatest strength of synchronous e-language learning](image)
50% participants (n=510) found all aspects as strengths of synchronous e-language learning and 28% (n=153) were in favor of face-to-face interaction with teacher as the greatest strength. The students were asked about the greatest weakness of synchronous e-language learning in the next question (Figure 11). The options given were ‘time bound’, ‘connectivity bound’, ‘high bandwidth requirement’ and ‘immediate response’.

![Figure 11: The greatest weakness of synchronous e-language learning](image)

37% of the students (n=381) considered ‘being time bound’ as the greatest weaknesses of synchronous e-language learning, and 25% (n=252) considered all options as weaknesses of synchronous e-language learning.

**Ideal Context for E-language Learning**

Question 18 sought students’ preference for a/synchronous modes or a blend of both (Figure 12).

![Figure 12: Better mode for e-language learning](image)
62% (n=578) were in favor of a blend of synchronous e-language learning and asynchronous e-language learning and 1% (n=9) were in favor of synchronous e-language learning.

The last two questions (19 and 20) were explicitly open-ended, seeking participants’ suggestions and additional comments, if any. The opinions were very much like the responses to question 18, i.e. a preference for the blend of two models. A summary of the responses is as follows:

1. A blend of a/synchronous should be there
2. Asynchronous mode is beneficial for on-job students; therefore, synchronous sessions should be conducted after 5 pm.
3. Synchronous sessions are very important for the improvement of the spoken English of the students.

The summary of the additional comments is as follows:

1. Some attention should be paid to the handwriting aspect.
2. Synchronous sessions should be bilingual.
3. All lectures should have Urdu/English subtexts.
4. Traditional face-to-face teaching facility should be available at campuses.
5. Announcements should be sent to the students’ mobiles as text messages.

On GDB, almost all students favored a blend of the synchronous and asynchronous model.

**Discussion**

Although synchronous e-learning is increasingly becoming popular all over the world due to better speed of the Internet and technological advancements (Chen, Ko, Kinshuk & Lin, 2005), the observation of the participation of the students shows them to be more active in asynchronous mode, whereas their opinion is more in favor of the ideal blend of the two modes of instruction.

The responses of the students to the questions whether English language can be better learnt in a synchronous or asynchronous mode is very interesting. As per the researcher’s expectations, 82% of the participants favored synchronous mode, whereas about asynchronous mode 57% responded positively. This reflects a psychological sense of loss of not being able to talk to or see the teacher and a wish to interact directly, as they used to in their traditional classrooms. However, majority of them were in favor of a 30 minutes synchronous session, contrary to the practice of one-hour session already in practice in all English courses.

Simultaneously, they were very positive about all asynchronous Elltivities, like written compositions on MDB and GDB and assignments. Majority (56%) considered all of the options, whereas 13% considered assignments to be the most helpful Elltivity. If the ‘all of the above option’ were not there in the questionnaire, students might have chosen assignments as the best Elltivity for language learning. As per data analytics, most of the students actively participate in submitting assignments, although the weightage of assignment marks is not much in the overall result. The assignments help them improve their written constructions of English more than any other Elltivity. This is because they get ample time to read, reread, and practice for finally composing their answers. Assignments questions are carefully devised to facilitate task-based language learning. Assignment writing polishes reading and writing skills of students whereas synchronous sessions can improve their listening and speaking (Wang & Chen, 2009). Students’ opinions clearly reflect their awareness about the possible improvement of speaking skill via synchronous session and a desperate desire for that as well. This reflects their metacognition about the possibilities ELLE provides for L2 learning, as well as extrinsic motivation to learn English speaking as that is a prerequisite for a successful career and even self-esteem in Pakistan.
The most interesting part of the responses is that a majority of participants admitted that they did not actively participate in the synchronous sessions (hardly 1% participated as per VU data record), yet 62% claimed that the participation improved their English. The responses to the two questions have a discrepancy and as per the data analytics of synchronous sessions, students either could not participate in synchronous sessions because of job commitments or the technological problems became a barrier. Students’ demographical details as well as their opinions clearly manifest that majority is that of working professionals and they may prefer synchronous sessions after 5 pm i.e., after office timings. Due to this aspect, participation in asynchronous Elltivities remains far more overwhelming than synchronous Elltivities as many students get enrolled in online programs because of their asynchronous i.e., not time bound nature (Hrastinski, 2008). Another possible reason for least participation could be their low level of listening and speaking proficiency in English language.

As the mode of interaction in synchronous sessions was English language, they might have low level of confidence in participating due to affective filter (Krashen, 1982). Students’ demographic details show that most of them must have an exposure to English in their previous study programs. Still, for conducting a successful synchronous session in English language, a careful needs analysis of the students is required, as they may not have an exposure to listening and speaking English. This is obvious from their opinions as they wish for bilingual session. These results further strengthen the need of synchronous sessions for improving listening and speaking skills.

The issues discussed above can be further elaborated by the participants’ response to the strongest and weakest points of asynchronous modes of language learning. Whereas 34% felt the deficiency of face-to-face communication as it can increase their motivation (Yamagata-Lynch, 2014), 15% complained about non-simultaneity of answers/communication. However, they were happy with the fact that asynchronous mode was not time and place bound and gave time for reflection to construct responses in L2. Therefore, asynchronous mode is more suitable for them. This is also confirmed by their response to the greatest weakness of synchronous mode where instead of choosing ‘all of the above’ option, 37% participants chose ‘time bound’ option. These results show that in a virtual system students are mostly not available for time bound synchronous Elltivities because most of them are on job (McLoughlin & Lee, 2010a).

The results show that students would like to have a blend of the two models for best possible language learning. They cannot be time bound and would prefer for asynchronous mode already in use at VUP but occasional synchronous Elltivities—which should be optional—can give exposure to listening and speaking skills and provide face-to-face interaction and motivation, which will help them a lot without becoming difficult to cope with. Both modes complement each other; synchronous can be resorted to for discussing more complex concepts but switching to asynchronous mode would be appropriate where reflection over a time period is required (Hrastinski, 2008). Both modes facilitate different types of cognitive processing and can polish students’ metacognition about language learning. The results of the study complement the researchers’ observation that both a/synchronous modes have gaps which can be filled by a blend to improve students’ integrated skills through a principled eclectic or multimodal approach.

The unexpected result was one of the students’ suggestions about giving some consideration to the improvement of handwriting in English language by getting the scanned handwritten assignments. Handwriting of a foreign language is a major issue to ponder upon in online learning. The students also suggested subtexts to be run in both Urdu and English languages, which shows their background of learning English language through Grammar Translation Method. Student’s being time-bound was also determined by the opinion that even announcements of LMS should be sent to them via mobile phone text messages. No system can be perfect, however, efforts to achieve the best possibilities should continue. A hybrid or blended model can be a solution to many problems.
Conclusion and Implications

The findings of the study indicate that a blend of synchronous and asynchronous modes is more desirable for English language learners of Virtual University of Pakistan (VUP). The assessment of the perception of the students about a/synchronous language learning environment helps the researcher to develop deeper understanding of the relationship between content, pedagogy, technology and the context of the existing instructional design (Koehler & Mishra, 2005); as well as the measures to be taken in the future for developing an integrated instructional design for language teaching in general and second language teaching in particular. Collaborative language learning can take place on both synchronous and asynchronous forums with the only difference of simultaneity. Asynchronous mode can be beneficial as students can construct their responses in L2 by carefully thinking and analyzing. Synchronous sessions can add pressure to respond immediately and they can monitor as to how much deep learning has taken place when they have to respond immediately using correct constructions. Therefore, synchronous Elltivities should be scaffolded over asynchronous Elltivities for deep learning. A blend of both can work in an ideal manner for teaching language, as it will encompass all techniques/methods of language learning/teaching. Only a careful planning of when to use which mode is required on part of the planners/teachers. For this purpose, a specific virtual language teaching curriculum/ instructional design should be worked on to cater the needs of Pakistani students.

The results excavate many areas for future research e.g., the blend of face-to-face and online language teaching environments, challenges involved in the use of bilingual online mode for L2 teaching, future of students’ English handwriting and teaching L2 through the use of kinesthetic in both a/synchronous modes, etc. As the sample size was large, the results can be generalized to all other subjects taught at VUP. Last but not the least, as online education is no more a new phenomenon, it’s time to design subject-oriented a/synchronous learning environments rather than just to talk about general online learning environments.

Acknowledgment

A note of thanks to Gilly Salmon for inspiring me to coin the term Elltivity by playing upon e-tivity.

References


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Mobile Learning Practice in Higher Education in Nepal

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Abstract

During the 15 years of this current century, mobile technology has become a leading technology in the support of educational outcomes. This study investigated the mobile learning practices among undergraduates in higher education in the semi-urban and rural areas of the Gorkha district of Nepal. The objectives were to explore the availability of mobile technology for learning; its costs; learning trends, institutional policies, and attitudes towards mobile learning. These factors were explored to identify implications for pedagogical practice. The study adopted a mixed methods design, in which the quantitative data were collected by using a questionnaire with a sample of 161 undergraduates from six campuses. The qualitative data were collected from 19 purposively selected respondents by the way of semi-structured interviews. The result indicated that virtually all undergraduates possessed their mobile phones and used them informally for learning both inside and outside of their classes. The majority of the students had positive attitudes towards mobile learning. However, many were not satisfied with the effectiveness of their practices or with the level of institutional support for using mobile devices to support their learning. Although comprehensive mobile learning is not widespread in Nepal, enriching conventional learning by the incremental use of mobile devices is possible in Nepalese institutes of higher education. I conclude that teachers and institutions should provide guidance to students about the effective uses of mobile technology because successful use of technology in learning largely depends on appropriate pedagogy and teacher support.

Keywords: Mobile learning; Nepal; higher education; electronic learning; educational technology; digital divide

Mobile learning has become a distinctive area of modern digital learning. The United Nations Educational, Scientific and Cultural Organization (UNESCO) celebrated a Mobile Learning Week in February 2015, with the theme “leveraging technology to empower women and girls” (UNESCO, 2015). Its mission was to close the gender gap by promoting women’s learning in developing countries with affordable handheld technology. The conference was an example of the impact of mobile learning across the world. Increasing numbers of conferences, workshops, seminars, and journal publications on mobile learning provide testimony to the influence of mobile learning across the world (Ally, 2009; Traxler, 2007). This paper discusses mobile learning practices among undergraduate students in rural areas of Nepal and considers Nepalese readiness to adopt mobile devices for learning in higher education.

Theoretical framework for mobile learning

Mobile learning is an emerging phenomenon and its effective use is presently unclear (Traxler, 2007; Mehdipour & Zerahkafi, 2013). Kukulska-Hulme (2009, cited in Shrestha, 2011, p. 108) argued that “mobile learning is a tricky term as mobility refers to mobility of technology, content and learners in the context of learning”. There appears to be no consensus about how to conceptualise or define it (Ally, 2009). Mobile learning is often viewed as an updated version of e-learning, which incorporates learning experiences with electronic devices. Mehdipour & Zerehkafi (2013) claim that there is a whole part relationship between e-learning and mobile learning in the wider context of digital learning. This view considers mobile learning as a part of e learning. Their relationship can be illustrated in Figure 1.
Figure 1: Relationship between mobile learning and e-learning

Figure 1 shows that mobile learning is a part of e-learning. Similarly, e-learning is a part of modern digital learning. Mobile learning can be viewed as a paradigm shift within the framework of e-learning. E-learning is often equated with the Internet connected desktop computer based learning experiences. Mehdipour and Zerehkafi (2013) drew a distinction between e-learning and mobile learning.

E-Learning can be real-time or self-paced, also known as “synchronous” or “asynchronous” learning. Additionally, E Learning is considered to be tethered (connected to something) and presented in a formal and structured manner. In contrast, mobile learning is often self-paced, un-tethered, and informal in its presentation (p. 9).

Traxler (2007) claims that the distinction between e learning and mobile learning is blurred because mobile technology has largely overcome previous barriers of effective mobile learning. For example, mobile devices have considerable connectivity, screen size, storage, and processing power. Consideration of the definitions of mobile learning is necessary for enabling a detail discussion on it.

In essence, mobile learning is learning with a mobile hand held electronic device, at any time, anywhere (Kukulska-Hulme & Shield, 2008, as cited in Shohel & Power, 2010). In a broad sense, mobile learning refers to any learning that occurs when the learner is not at a fixed, predetermined location, or learning that occurs when the learner takes advantages of opportunities offered by mobile technology. In a narrow sense, O’Malley et al. (2005) stated that mobile learning refers to any kind of learning experiences with handheld mobile devices that take place both inside and outside the classes. This article views mobile learning as any kind of learning experience gained with portable digital devices both inside and outside the class.

The concept of mobile learning is in consistence with the modern concept of lifelong learning. Sharples, Taylor and Vavoula (2006) observed a convergence between modern form of learning and technology. They stated that new technology (personal, user-centered, mobile, networked, ubiquitous, and durable) is suitable for new learning (personalized, learner centered, situated, collaborative, ubiquitous, and lifelong). They outlined some assumptions of mobile learning, which reflect the views of twelve Mlearn project research leaders from various countries of world. They viewed that learner as mobile and learning is interwoven with other daily activities. The control and management of learning can be shared between teachers and students. The learners through interactions create learning context. Learning can fulfill goals and set new goals. Mobile learning can complement and conflict with formal education. Ownership of learning and privacy are ethical issues in mobile learning. Rapid advancement and diffusion of technology in rural areas provide learners with opportunities to connect them with the larger learning communities outside their classes. This study was based on these assumptions of mobile learning.

Advantages of mobile learning

The discussion about the advantages of mobile learning began from the beginning of this century. The first Mlearn conference was organized in Birmingham in 2002 (Traxler, 2007). Initially, mobile
Mobile learning was seen as an innovative use of the latest information and communication technology in education when voice call and text messaging were the main features available in mobile devices. Currently, the development of portable, handheld mobile devices with Internet connectivity has offered greater access and possibilities for interaction and collaboration among teachers and students. Media rich capabilities such as, decreasing weight, wider screen size and high resolution, high storage and processing speed, extended battery backup are fueling a transition to a ‘Mobile Age’ (Lee & Chan, 2007).

Mobile learning has a number of benefits. Mobile learning provides learning opportunities inexpensively because the cost of mobile devices is significantly lower than PCs and laptops. It also reduces the burden of buying several gadgets since it has the capacity to create and deliver multimedia contents. This can be used for both continuous and situated learning support. The user-friendly design of mobile devices reduces training costs for the learners and the teachers. It might also provide rewarding learning experiences. They have potential to improve levels of literacy, numeracy, and participation in education among young adults (Mehdipour & Zerehkafi, 2013). Similarly, they can be beneficial for both formal and informal learning because they offer an additional platform for interaction among teachers and learners on the one hand, and sharing content knowledge on the other hand. They can promote learners’ active participation in learning process. Research project has confirmed positive outcomes for mobile learning in both formal and informal learning situations (Kumar et al., 2010; Hayati, Jalilifar & Mashhadi, 2013). In the Nepalese context, mobile devices can provide opportunities to access the Internet from remote location.

**Nepalese context for mobile learning**

Nepalese educational institutions are primarily structured at school and university level. Schools run from pre-primary level to grade 12. Grades 11 and 12 are referred to as the higher secondary level. Universities and other tertiary institutions offer undergraduate to PhD level programs. Schools and undergraduate colleges tend to be located in remote areas.

The advent of mobile phones in Nepalese schools has posed a major threat to the ecology of the school, and school administrators have attempted to restrict their use because is thought to be disruptive in classrooms (Bishowkarma, 2007). Policy-makers appear to be unaware of the positive uses of digital technology inside and outside the classrooms. However, students from grades 6 to 10 have been using mobile phones secretly in their classes. The mobile penetration rate was 51.1 percent (Nepal Telecommunications Authority, 2011) when Bishowkarma prepared the report. He reported cases both of mobile use and misuse in schools. His article indicated the emergence of unsupervised mobile learning in Nepalese education.

The Higher Secondary Education Board (HSEB) decided to ban mobile phones in grades 11 and 12 to prevent distractions on study in the school (HSEB, 2013). This issue generated heated debate among educationists, teachers, and students. Though some teachers and guardians welcomed the decision, the students clearly showed their dismay and argued that banning mobile phones is not a solution because a lot can be learned by using information and communication technologies. The HSEB decision has not been strictly implemented because of ineffective monitoring. Most parents and teachers still have reservations about mobile uses in schools. However, mobile learning is increasing in informal learning and this has received very little attention.

Nepal has better infrastructure for mobile communication technology than other forms information communication technology. Nepal Telecommunications Authority (May, 2015) reported that the mobile penetration rate in Nepal was 86% at the end of 2014. In line with other countries, young people, including the university students, comprise the large portion of mobile subscriptions. Wider
Accessibility of the technology has increased the possibilities of mobile learning among Nepalese students. Whereas the Central Bureau of Statistics (CBS) reported that only 7% households had a computer in Nepal by 2011 (CBS, 2012), the latest data shows that mobile and internet penetration rates are approximately 101.17% and 44.37% respectively by 17th July, 2015 (Nepal Telecommunications Authority, December 2015). Broadband Internet is available in a small number of cities. Ninety-five percent of users access the Internet by mobile phones. Nepal is making rapid progress in adopting mobile technology, which is a prerequisite for mobile learning. The pace of technological advancement is much faster than their educational application and evaluation (Terras & Ramsay, 2012).

**Review of policies and plans for mobile learning**

Discussion on information and communication technology integration in Nepalese school and university level education started recently. The government of Nepal has formulated a master plan for ICT integration in education. The vision of the master plan is to “ensure extensive use of ICT in education sector and contribute for access to and quality education for all” (Ministry of Education, 2013, p. 4). It has a policy to bridge the existing digital divide by providing ICT integrated teaching and learning environments. Some pilot programs are assessing the use of information and communication technology in schools. Tribhuvan University (TU) and Kathmandu University (KU) have policies that are designed to support the use of computer technologies for open and distance education students.

TU has taken some initiatives to integrate information and communication technology (ICT) in higher education. TU Faculty of education offers teacher preparation course (B.ED in ICT) and Faculty of Management offers Bachelor of Information Management (BIM). Institute of Engineering has Centre for Information Technology (CIT) and Information & Communication Technology Centre (ICTC). TU established the Open and Distance Learning Center in 2015, which aims to “provide access of quality higher education to mass people in Nepal through open and distance mode”. The Center will also support other institutions to integrate e-learning by hybridizing traditional education programs as a gradual transition to virtual learning (ODEC-TU, 2015). The Center will develop android application to assist learning (Adhikari, 2015). This initiative endorses mobile learning formally in the Nepalese higher education sector. The Center will develop resources and train faculties to promote information and communication technology in open and distance education. In this context, mobile technology can bridge the digital divide by offering an alternative technology for learning. Mobile learning based on new developments in mobile technology is an emerging trend in Nepalese higher education. Mobile devices might be an alternative technology to integrate information and communication technologies in Nepalese education. However, it is too early to predict how these initiatives will change Nepalese education. It is important for universities to examine students’ current mobile learning practice before implementing new modes of learning.

**Research on Mobile Learning in Nepal**

There is a scarcity of research studies on mobile learning in Nepal. No formal research reports appear to have been published. However, there are a few magazine, journal and blog articles. Bishowkarma (2007) stated that he did not find any formal research on mobile learning in Nepal. His article published in Sikshak magazine shed some light on the issue. He pointed out threats and prospects for mobile learning in Nepalese schools. Based on a field survey carried out by Sikshak magazine inside the Kathmandu valley and other districts (Tanahu, Biratnagar and Jhapa), he reported that a large number of school students beyond grade 6 had carried mobile phones in class.

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Schools had attempted to ban mobile phones in but these attempts have been mostly unsuccessful. The survey revealed both uses and misuses of mobile phones. Few students used mobile phones for learning word meanings, discussing homework, or solving arithmetic problems using the calculator features. They used the alarm feature to wake up in the morning. They listened to music and the radio, watched videos, browsed the Internet, and updated Facebook. On the darker side, the survey also revealed that some students watched pornographic videos and photos. Some students reported that they were bullied using mobile phones. Shrestha (2012) conducted research in some schools in the Chitwan district in Nepal with low-cost open-source mobile devices, specifically Ben Nanonote and Wikireader to access offline sources. His study showed that learning with mobile devices promoted student centered learning. He noticed the scarcity of appropriate content customized for Nepali learners. No previous research appears to exist on mobile learning practices among university students in Nepal.

**Framework of the study**

Mobile learning practices depend on several variables. This study investigated some major determiners of mobile learning practices. The key variables of the study are presented in the diagram in Figure 2.

![Factors affecting mobile learning](image)

**Figure 2: Factors affecting mobile learning practice**

Figure 2 presents factors that affect mobile learning. Students’ mobile learning practices depend on personal factors like age, gender and interest. Type of devices, network availability, battery backup, screen size and resolution, apps and other features available in the devices are some of

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1 This study was conducted in May 2014, one year prior to the great earthquake in Nepal which badly affected the Gorkha District where this study was conducted.
the technological considerations, which influence actual uses of mobile for learning. Similarly, institutional policy, the nature of curriculum and the assessment system also influence teaching methodology. Other important factors include teachers, parents, and peers’ support for mobile learning. Theoretically, mobile learning takes place at any time anywhere (Kukulska-Hulme & Shield, 2008, cited in Shohel & Power, 2010). However, students’ time for other activities, such as part time employment, and family commitments might contribute to variation in the mobile learning practices. Cost of devices, call rates, mobile data charges, availability of Wi-Fi for internet connections are some of financial considerations, which might also limit the use of devices.

**Significance of the study**

It can be seen from the discussion above that mobile learning has received mixed attention in Nepal. Mobile learning research has attracted few researchers. No one has carried out comprehensive research in Nepalese higher education yet. In this context, investigating students’ current mobile learning practices will be significant since it will provide some descriptive data for educational policy maker, planners, administrators, and teachers.

**Objectives of the study and research questions**

The main objective of this study was to explore the mobile learning practices of university level students in Nepal. Its other objectives were to explore the availability of technology, financial consideration of mobile learning gadgets, data charge, students’ affordability, institutional policy and practices, teachers’ and parental support to students in mobile learning. It also aimed to suggest some implications for teaching learning and research.

This study was designed to answer the following research questions:

1. What is the technological and financial readiness for mobile learning among undergraduate students in rural areas of Nepal?
2. How do students use their mobile devices for learning?
3. What are their views on mobile learning?

**Method**

**Research design**

This research used a mix methods design employing both quantitative and qualitative techniques in a two-phase sequential data collection process, as an exploratory and descriptive research project. A student survey was conducted with a questionnaire containing both closed and open-ended questions. After the initial analysis of survey data, for more comprehensive data on mobile learning across the diverse background of participants within the district, semi-structured interviews were carried out with students selected by judgmental sampling. The interviews helped to clarify and interpret trends and issues that emerged from the open-ended section of the survey.

This research was carried out in the Gorkha district of Nepal. It is located in mountainous area about 140 kilometers west of Kathmandu, the capital city of Nepal. There are six campuses of Tribhuvan University (TU) in the district. Two of campuses have limited access to the Internet mostly for administrators and faculties. Two are in the district headquarter, which is in semi urban area. Others are in rural area. All the campuses run classes in the morning. Most of the students are from rural areas. Most come from farming family and help their parents in farm duties in the afternoon. They spend considerable amount of time walking to and from campus because of limited public transport. Female students outnumber male students in all the campuses.

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The population of the study was all of the undergraduate students at six campuses of Tribhuvan University (TU). One of them was the constituent campus of TU, and the others were affiliated campuses. The sample comprised 161 randomly selected undergraduate students (40 men and 121 women), with ages ranging from 17 to 28 years. Nineteen students (3 men and 16 women) were selected through judgmental sampling for in-depth interviews; these students included those with a disability, those with different types of mobile devices, and students from different geographical and cultural backgrounds.

**Data collection and analysis**

To survey students’ demographic data, mobile learning practices, and attitudes towards mobile learning, a questionnaire was constructed which contained both open ended and close questions. The initial version of the questionnaire was based on the author’s ideas on important issues on mobile learning and informal discussion among colleagues. To ensure content validity, first it was sent to three experts, including one who was working in open and distance learning for their feedback. After reviewing their feedback, the modified questionnaire was piloted with 10 students at Drabya Shah Multiple Campus. Following information received from the pilot study, some questions were removed, and for example, information on mobile brand, and number of years they were using mobile phones and how often they changed their mobile phones. The final version of the questionnaire consisted of five sections. The first was to obtain demographic data, the second focused on access to technology, the third was on general uses of mobile, the forth section on academic uses and the final section was on students perceptions of other issues relating to mobile learning.

The revised questionnaires were administered to the target students in their class in the target campuses after gaining consent from campus authorities. The students were assured of the privacy of their responses. The respondents were given freedom to maintain their anonymity. They voluntarily participated in the survey. After the initial analysis of the survey, 19 students were interviewed for in depth information on their practices and their expectations regarding mobile learning, using an interview guide. Six questionnaires were discarded because they were not completed. It was also found that some of the respondents missed some of the open-ended questions, which did not affect the analysis of questionnaire.

The researcher administered the questionnaire in person to ensure that participants could seek clarification of the questions on the spot. Most of the questions were answered with relevant information. The researcher interviewed the respondents individually. They could freely share their experiences.

The closed ended questions were coded and analyzed using the Microsoft excel program. Simple descriptive statistical procedures were carried out on the quantitative data. Similarly, content analysis of mobile uses in general, mobile learning activities, challenges and their attitudes on mobile learning, teachers’ behavior, and parental support were performed on the qualitative data to describe the data trends.

**Results**

**Quantitative data**

*Demographical profile of the respondents:* The first section of the questionnaires had questions on the background information of the respondents. An analysis of the first section of the questionnaire generated a demographic profile of the respondents, which showed that 75% of the respondents were women and only 25% were men. Their ages ranged from 18 to 28 years with a mean age 20.22 years, and a standard deviation (SD) of 1.93. Each campus in the district was represented...
in the study with 28% of the sample from Drabya Shah Multiple Campus, 34% from Gorkha Campus, 10% from Bhimodaya Campus, 13% from Bhawani Multiple Campus, 9% from Dullav Multiple Campus, and 6% from Paropakar Multiple Campus. The sample comprised 25% of the respondents from the Faculty of Management, and 75% from the Faculty of Education. The majority of the respondents (77%) were full-time students.

Accessibility and cost: The second section of the questionnaire explored students’ accessibility to mobile technology and financial costs. All students had a mobile phone. Almost half of them (45%) had smart mobile phones and a little more than half of them (55%) had basic mobile phones. However, only 24% of them had computers (17% laptop & 7% desktops). Similarly, 32% had a digital camera, 5% had an iPad and 24% had Mp3 players. Mobile Internet use is popular in Nepal. Seventy-nine percent of respondents had Internet connections on their mobile phones. The average price of their mobile phone was Rs 7,440 ($US74.40). Seventy-seven percent of the respondents paid less than Rs 10,000 ($US100) for their mobile phones. The average monthly expense of respondents was Rs288 ($US2.88) per month. Almost half of them spend around Rs 200 ($US2) per month for making calls and for data use.

General uses of mobile technology: The third section of the questionnaire sought to find how the respondents used their mobile phone in day-to-day life. All of the respondents used their mobile phones for making phone calls and sending text messages. Email was used by 40% the respondents, 68% of them used their mobile devices for entertainment, 50% used them for browsing the internet, 81% for playing games, 58% for social networking, 65% for reading online news, and 90% used them for taking photos.

Mobile learning practices: The fourth section investigated students’ mobile learning environments and practices. The majority of the respondents (82%) used their mobile devices for learning outside their classroom. Only 18% of the respondents stated that they wanted to use their mobile devices in class. Home is their favorite place for mobile use (80%). Nobody reported that the classroom was their favorite place for mobile learning. Thirty percent of the respondents were not sure whether they could use a mobile device for learning in the class or not. One-third (33%) reported that they were not allowed to use mobile phones in class whereas 37% reported that they were allowed to use mobile phones for learning in class. The majority of the respondents (55%) reported that they did not get any support from their teachers for mobile learning.

Figure 3: Uses of Mobile Phones for Learning
Figure 3 shows how different functions of mobile phones were used for learning purposes. The majority of the respondents (74%) used their mobile device for using offline (downloaded content). On the other hand, only 59 (36%) of the respondents used their mobile for accessing online content. Similarly, 54% of the respondents used their mobile to listen to media broadcasts. Figure 3 also reveals that a large number of respondents (60%) used their mobile for recording their English speaking practice. Likewise, 46% respondents used an online dictionary and 58% of the respondents used off-line dictionaries. Figure 3 also indicates that a small number of respondents recorded (22%) class discussions.

The fifth section was developed to explore students’ perceptions of mobile learning practices. This section contained 12 Likert type items. Respondents were asked to respond to statements on a five point scale ranging from strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree (1).

### Table 1: Likert Scale Mean Scores for Students’ perception of mobile learning

<table>
<thead>
<tr>
<th>S. No</th>
<th>Statements</th>
<th>Agreed</th>
<th>Undecided</th>
<th>Disagreed</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobile phone can facilitate learning.</td>
<td>141(88%)</td>
<td>16(10%)</td>
<td>4(2%)</td>
<td>4.2</td>
<td>0.77</td>
</tr>
<tr>
<td>2</td>
<td>The campus administration should allow students to use mobile in the class for learning purpose.</td>
<td>126(78%)</td>
<td>21(13%)</td>
<td>14(9%)</td>
<td>4.02</td>
<td>0.99</td>
</tr>
<tr>
<td>3</td>
<td>Students need orientation/training for mobile learning.</td>
<td>418(86%)</td>
<td>20(12%)</td>
<td>4(3%)</td>
<td>4.37</td>
<td>0.82</td>
</tr>
<tr>
<td>4</td>
<td>The campus administration should ban on mobile phone use in the class</td>
<td>31(20%)</td>
<td>14(9%)</td>
<td>115(71%)</td>
<td>2.29</td>
<td>1.15</td>
</tr>
<tr>
<td>5</td>
<td>Students will use mobile appropriately in the class if they are allowed to use</td>
<td>91(57%)</td>
<td>37(23%)</td>
<td>33(20%)</td>
<td>3.47</td>
<td>1.10</td>
</tr>
<tr>
<td>6</td>
<td>Teachers should guide students for effective mobile learning.</td>
<td>136(84%)</td>
<td>16(10%)</td>
<td>9(6%)</td>
<td>4.15</td>
<td>0.90</td>
</tr>
<tr>
<td>7</td>
<td>Mobile phone hampers study.</td>
<td>58(36%)</td>
<td>59(37%)</td>
<td>44(27%)</td>
<td>3.16</td>
<td>1.10</td>
</tr>
<tr>
<td>8</td>
<td>Mobile learning can replace traditional face to face class</td>
<td>51(32%)</td>
<td>7(4%)</td>
<td>103(64%)</td>
<td>2.47</td>
<td>1.36</td>
</tr>
<tr>
<td>9</td>
<td>Mobile phone narrows down the digital divide existing in the country.</td>
<td>123(76%)</td>
<td>25(16%)</td>
<td>13(8%)</td>
<td>3.95</td>
<td>0.98</td>
</tr>
<tr>
<td>10</td>
<td>Mobile learning should be integrated in formal education system.</td>
<td>123(76%)</td>
<td>25(16%)</td>
<td>13(8%)</td>
<td>3.85</td>
<td>0.82</td>
</tr>
<tr>
<td>11</td>
<td>Parents have positive attitude towards mobile use for learning.</td>
<td>79(49%)</td>
<td>34(21%)</td>
<td>88(30%)</td>
<td>3.27</td>
<td>1.20</td>
</tr>
<tr>
<td>12</td>
<td>Teachers have positive attitude towards mobile learning.</td>
<td>83(52%)</td>
<td>42(26%)</td>
<td>38(22%)</td>
<td>3.28</td>
<td>1.13</td>
</tr>
</tbody>
</table>

Note: Likert scale was designed with five points. Strongly agree and agreed have been grouped under agree and strongly disagree and disagree have been grouped under disagree in the table.
Table 1 shows that the majority of respondents clearly agreed with the positive role of mobile devices in learning (Mean = 4.2/88%) and a similar number expressed the view that students should be allowed to take mobile devices to class (Mean = 4.02/78%). The table also shows that almost two thirds of the respondents were against banning mobile phones in class (Mean = 2.97/71%). A little more than half of the respondents agreed that they would use their mobile device appropriately if they were allowed to use it in the class (Mean = 3.47/57%). The table also indicates that they wanted some sort of orientation for mobile learning (Mean = 3.27/66%), and nearly the same percentage agreed that teachers should provide guidance for mobile learning (Mean = 3.15/64%). The respondents had mixed views about the negative potential of mobile devices on learning. Thirty six percent agreed that mobile devices had a negative role, 37% were undecided, and 27% disagreed about the negative role of mobile devices on learning. Relatively, large numbers of respondents disagreed that mobile learning can replace face-to-face learning (Mean = 2.47/64%). The data showed that they favored a blended learning mode. Similarly, they agreed that mobile phones could narrow the existing digital divide in the country (Mean = 3.95/76%). Furthermore, almost equal numbers of students agreed that mobile learning should be integrated into the formal education system (Mean = 3.85/76%). However, only about half of the respondents agreed that their parents and teachers had positive attitudes towards mobile learning.

Results from interviews

The following themes emerged from the analysis of the interview data.

Listening to audio books: Although it is not a very popular activity, some students learn by listening to downloaded material on their mobile devices. Students download some audio novels or stories and listened to them. Some of them listen to course related content. A visually impaired participant reported that she regularly listened to course related content on her mobile. “We do not have books in Braille. Some audio books are available. I have downloaded them on my memory card and I listen to them whenever I want. They are blessing for us. We can study whenever we want” (Participant 1). She also had planned to record her English textbook, which was not available in audio format, asking her teacher to read for her.

Recording class lectures: Most of the students record their spoken activities and listen either for learning or for entertainment. Some students secretly record their teachers’ class lecture. Participant no 4 admitted that she recorded class lectures. “I have secretly recorded class lectures several times but I fear a lot. I think if the teacher knows it, he will be angry with me” (Participant 7).

Dictionary use: Dictionary use is a popular function of mobile devices. The students use both online and downloaded dictionaries on their mobile phone. One participant said, “Mobile dictionaries are easier to carry and faster to find words” (Participant 6).

Web searches: The study also shows that the respondents use the Internet function on their mobile devices. One of the participants said, “I remember I had searched various reasons for learning English on the Internet” (Participant 4). Another participant said, “I get confused with large amount of information after Google search. I cannot choose appropriate content “ (Participant 5).

Phone calls: Some participants reported that they made phone calls to their teachers for learning. However, they reported that they phoned their friends and discussed their course while preparing for exams. “I had a problem with one question. Then I called one of my friend she helped me to find answer” (Participant 4).

Chat: Some of the participants admitted that they did not discuss course content on Facebook and other Messengers site. However, they kept track of course while chatting if they could not go to campus. “I ask what happened in the campus and what was taught in the class if I missed my class while chatting on Facebook” (Participant 11).
Photographs: Participants used their camera function to learn. They reported that they took photographs of different books or board and readings. "My friend and I have different writers’ books. When I find a useful text in her book, I capture the text with my mobile phone. It saves my time to copy. I can easily collect text from different sources" (Participant 7).

Calculators: Many students used their mobile for calculating. "As it is readily available, I use it for simple calculation" (Participant 11).

Discussion, Conclusion and Recommendations

The present study gathered and analyzed data to understand current trends regarding mobile learning practices among undergraduates in the Gorkha district of Nepal. The result confirmed that students generally have a sound technological understanding and positive attitude towards mobile learning. Almost all of the students have a mobile phone with a good number having smart phones. Cost of technology is an important issue. They can buy low price smart phones. However, use of the phones for learning is expensive. No higher institution provides free Wi-Fi facilities for the students in the district. It is expensive for the students to download audio and visual learning material with a mobile data service on the one hand and poor speed and connectivity are other issues with Internet access on the other hand. Although, it is somewhat, some students are using their mobile devices for informal learning. They are using their mobile devices mainly for checking word meanings, browsing the web, and accessing multimedia. It shows that students need to learn and practice several other ways for the optimal use of their mobile devices for both formal and informal learning.

Recently, some universities have initiated few programs with open and distance mode of learning using information and communication technology in Nepal. Mobile phones are readily available in Nepal. Therefore, success of new open and distance programs learning will largely depends on the use of mobile devices as the basic technology of learning. It is necessary for parents and teachers to play a supportive role if mobile learning is enabled to fulfill its potential. Although the present research was based on students in semi-urban and rural areas of Nepal, the findings might be useful for other developing countries where issues of technological and pedagogical developmental are similar.

Challenges of mobile learning in Nepalese higher education

There are numerous of challenges for implementing successful mobile learning practices among university level students in Nepal. These are financial, technological, policy related, pedagogical, and ethical. The cost of appropriate mobile gadgets and operation cost is beyond affordability of students in rural areas. More than half of the students use ordinary cell phones. Smart phones and tablets, more comfortable devices for on screen reading, cost more than ordinary cell phone. Expensive data charges are another financial barrier for Internet based mobile learning. Battery backup, mobile charging with long hours of power outages, poor network connectivity, the small screen size of cell phones, availability of suitable software and hard ware are technological challenges. Open and distance learning mode has just started with few programs. The support system is in the initial stage. Almost all programs of higher education hold face-to-face program which do not recognize the role of information and communication technology in education. Most of teacher use chalk and talk instructional approaches in the class. Unless teacher changes their pedagogy, mobile learning will not be successful.

Contribution of mobile learning to Nepalese higher education

Mobile learning can play a key role in Nepalese higher education by offering an additional platform for learning both inside and outside of the classrooms. Students can be members of a global learning
community and get opportunities to use the vast resources that are available on the Internet. Students and teachers do not need to always be in the same class at the same time for discussions. Learning is integrated with other day to activities. High dropout and absenteeism are common in classes of rural areas. If teachers deliver some lessons for use on mobile devices, it may keep irregular students on track with their learning journey. These can interact with teachers and other students.

**Recommendations for the implementation of mobile learning in Nepal**

_Policy:_ Although, some universities have introduced open and distance learning courses in few discipline, which use information and communication technology. However, there appear to be no written policies to guide mobile learning practices in higher education. In this regard, universities should formulate policies to recognize mobile learning as a supplementary mode of learning as part of blended learning in higher education. They should introduce hybrid courses at the undergraduate level. Current face-to-face learning can be enriched with the introduction of mobile learning. Every institute of higher education should be supported to develop as a resource and support center for mobile learning practices. This will help to reach more students who live in isolated rural areas of Nepal. The universities and tertiary institution should provide support training, orientation, and research for ICT integration and mobile learning practices on a wider scale.

_Operational:_ Policy should help people to develop understanding of mobile learning. However, the practice causes real changes. Each tertiary institution should create an appropriate environment for effective mobile learning practices. Each campus should formulate a code of conduct for mobile learning practices in the campuses. Teachers and students should set ground rules for judicious mobile learning practices in the class and outside the class for safe learning experiences. Faculties should conduct surveys on available technology and students’ mobile learning practices to develop a support system. They should organize seminars, workshops for effective mobile learning practices. They should develop a culture of information and resources sharing. They should develop mobile learning resources and share with the students. Campus administration should update the faculties with the available mobile learning technology. Each campus should provide facilities of Wi-Fi facilities so that students can use the Internet without worrying the mobile data charges.

_Pedagogical:_ Using technology in teaching is not end in itself. How and what students learn with their mobile devices largely depend on how technology is integrated to support teaching and learning process with the technology. Faculties should devise appropriate teaching methods which demands the use of their mobile learning in addition of face to face learning. Faculty members should develop flexible learning and assessment methods. Faculty members should send assignment, feedback, etc on mobile phone. Faculties should record class lectures and share with students, so that students focus on information processing, rather than information possessing.

**Limitations and further research**

Mobile learning is a complex phenomenon. This descriptive exploratory study assessed current mobile learning trends among undergraduate students in Nepal. The study excluded more mature Masters level students. The study was conducted in public institutions with students from rural and semi urban areas. Therefore, the results should be interpreted with caution where the situation in urban and private institutions may be different. This study has not included teachers’ and parents’ viewpoints. Therefore, future research should include other stakeholders, for example, teachers, principals, and parents. Longitudinal qualitative research and experimental research can examine the effectiveness of supervised and unsupervised mobile learning in this context in future.
Acknowledgement

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Development of a Scale to Measure Faculty Attitude towards Open Educational Resources

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Abstract

This paper describes the entire methodology for the development of a scale to measure Attitude towards Open Educational Resources (ATOER). Traditionally, it is observed that some teachers are more willing to share their work than others, indicating the need to understand teachers’ psychological and behavioural determinants that influence use of OER. The paper presents the methodological rigour in the development of the 17 items two-factor scale that is valid and reliable to measure attitude towards OER. The psychometric properties of the scale include: Content Validity Ratio=0.9 and Cronbach α=0.897 with strong inter-items correlation. The two-factors attitude construct in the scale was also subjected to a good model fit using Structural Equation Modelling, which revealed a mediocre fit with 0.8 Root Mean Square Error Approximation value and the chi-square to degree of freedom ratio below 3.

We also discuss the significance of the scale and how to use it with other variables effectively in different contexts to help develop appropriate strategies for promoting the use of OER in educational institutions.

Keywords: Open Educational Resources; Attitudes; ATOER Scale; Faculty; Psychological measures

Introduction

Open educational resources (OER) have emerged as one of the most useful teaching-learning practices in educational arena (Dhanarajan & Porter, 2013; Glennie, Harley, Butcher & van Wyk, 2012). They have been used to reduce time to develop courses and facilitate sharing of knowledge. To teachers and students, OER provide access to global content that can be localized without restrictions and create inclusive learning communities (Butcher, 2011). Mostly, OER are prepared by teachers for different learners in a specific context. Therefore, place of teachers and their attitude towards open education—to provide those conditions that would engage their learners as active participants—becomes essential.
However, several research studies reported that learning was tempered by teachers’ lack of expertise in OER. Petrides, Jimes, Middleton-Detzner, Walling and Weiss (2011) reported that faculty with lower comfort levels in using online technology uses open textbooks in more traditional ways; which hampers independent learning among students. But, with arrival of digital technologies, it has become easier for teachers to share their work not only with their students, but it has also offered opportunity to share their work globally. More specifically, this development encourages them to further develop, practice and model new behaviours with their students. Therefore, there is a need to understand teachers’ psychological and behavioural determinants that may influence better use of OER.

On this premise, our study involves understanding why some teachers share educational resources and others do not. In order to investigate this, we examine the OER perception (use and contribution) by teachers in universities as a combined intertwined psychological constructs of teacher’s attitude, motivations, their perception of quality and barriers. While the research is in progress, this paper describes development of a scale to measure Attitude towards Open Educational Resources (ATOER) within the framework of a research project in the global south to explore the use of OER and evidence of impact of OER. Thus, it discusses various phases of development and validation of a scale to measure faculty attitude towards OER and presents the findings of Content Validity Ratio (CVR), factor analysis and reliability co-efficient to report the psychometric properties of the scale. It also expands on a previous paper presented on validation of the scale at the 28th Annual Conference of the Asian Association of Open Universities (AAOU) from 28–31 October 2014, at the Open University of Hong Kong (Sharma, Mishra & Thakur, 2014).

Review of Related Literature

Review of literature is divided on the basis of three sets of constructs extracted from various studies: Awareness of OER, Sharing of Resources, and Adoption and Use of OER.

Awareness of OER

First set of studies (Mtebe & Raisamo, 2014; Jameela, 2014; Karunanayaka, 2012) have assessed teacher’s attitudes through understanding of their ‘Awareness’ of OER. These studies reveal that many teachers are not even aware of the concept and meaning of OER. Some of the teachers who are aware of the concept are not clear about copyright issues (Karunanayaka, 2012; Jameela, 2014). Nonetheless, there are teachers who have both knowledge and concept of OER and copyrights, yet they are not able to share or use their resources due to lack of technology skills (Mtebe & Raisamo, 2014).

Sharing of Resources

Second set of studies (Wang & Noe, 2010; Wild, 2011; Rolfe, 2012; Tuomi, 2013) have identified that the OER movement is primarily based on individual’s desire to borrow and ‘share resources’. Belief in open education, economic reasons and as a reputation enhancer—both for institution and individual—emerged as strong communal drivers for sharing resources (Rolfe, 2012). Additionally, there are several motives behind sharing behaviour, such as altruism, prestige and reciprocity, which may motivate teachers to share (Wang, & Noe, 2010). In addition, OER sharing also facilitates self-directed learning (Tuomi, 2013). A sense of belonging, shared purpose, and empowerment are the greatest drivers for sharing resources (Wild, 2011).
Adaptation and Use of OER

A third set of studies (Pegler, 2012; Hussain, 2013; Borthwick & Gallagher-Brett, 2014) investigated factors associated with ‘Adaptation and use of OER’ determining teachers’ attitude for engaging in OER. Free availability and reusability of OER, their reduced cost and ease of use are major reasons for teachers to adopt and use OER (Borthwick & Gallagher-Brett, 2014). In addition, amicable technology, teachers’ competencies, and their ICT skills also determine grounds for adopting and using OER (Hussain, 2013). For reusing OER, positive environment and availability of appropriate open licensed resources were found to be major factors (Pegler, 2012).

Rationale of the Study

Developing a measurement scale that is valid and reliable is always challenging. Several scholars argue that effective measurement is an underpinning of research (DeVellis, 2003; Netemeyer, Bearden & Sharma, 2003). Besides that, reliable and valid measures contribute to the legitimacy and development of a research field (Reynolds, 2010). Also, empirical articles that use rigorous methodological procedures, besides being firmly grounded in theory, receive more citations (Colquitt & Zapata-Phelan, 2007).

Research in OER field is quite recent and is not common due to lack of awareness, funds to support researches and other contextual dynamics. There is also a dearth of empirical research that follows sound methodological approaches. One Indian study by Venkaiah (2007) examined attitude and perception of distance teachers towards OER using a scale that was not subjected to psychometric validation. Researchers on OER have yet to adopt rigour in conduct of empirical studies, as in other fields of education. It could be due to its emerging nature or being rooted within Educational Technology, Information Communication Technology (ICT) and e-learning rather than as an independent field.

The motivation for this research springs from gaps in earlier studies related to OER. Whatever available research on attitude towards OER, they do not try to investigate underlying constructs. Content domain specification and item pool generation are not explained in detail. While much importance has been given to questionnaires and interview schedules, very few used scaling techniques to measure attitudes. Moreover, relevant research findings were not always utilized for constructing sound scales to measure faculty attitude towards OER.

Building on the methodological inadequacies of previous works, the current research aims to construct a rating scale called Attitude towards Open Educational Resources (ATOER) that can precisely identify positive and negative pre-dispositions to the concept and practices of OER amongst teachers. Literature review provided a basis for developing three major constructs for ATOER scale – awareness, sharing of resources, and adoption and use of OER.

The study contributes towards the practice of rigorous scale development in researching OER, and describes critical steps in scale development procedure.

Methodology

This section outlines the steps for validity, reliability and optimisation of ATOER scale undertaken in this study. The methodologies used are elaborated below for each step:

Domain Identification and Item Generation

Generation of items is the most important element of establishing sound measures (Hinkin, 1995). In the process of developing ATOER scale, initially 65 statements were pooled from review of
literature and classified into three main themes: Awareness, Sharing of resources and Adoption and use of OER. Afterwards, to avoid duplication, and have clarity, only 26 statements were selected through sorting process based on rigorous discussions within the internal research team. These 26 statements were subjected to content validity by the research team. A pool of 30 experts was drawn from the research literature and various projects, such as WikiEducator and the Research on OER for Development (ROER4D) group.

**Content Expert Validation**

This study uses Content Validity Ratio (CVR) proposed by Lawshe (1975) to identify valid statements. This was accomplished in three stages:

At first stage, only 30 experts were selected to express opinion on suitability of the identified 26 statements to measure attitude towards OER. They were asked to rate the statements in a three-point scale (1= Not necessary, 2= Useful, but not essential, and 3= Essential). We used an online survey tool to collect data, and experts were also given a brief about context of the research. CVR was calculated as described by Lawshe (1975) to assess the content validity.

Followed by first stage, CVR was re-calculated combining both ‘Essential’ and ‘Useful, but not necessary’ ratings to give a combine value of CVR_{E+U} at Second stage. This is a modified CVR approach (Kawachi, 2014).

At third stage, ATOER scale was further revised by adding more clarifying items. Language of the scale was further simplified, and it had 34 items. At this stage, we also separated items of the three constructs and sent the scale to the 30 experts, which resulted in only four additional responses.

We conducted another round of analysis, as the number of response in stage 3 was less. At this stage the average value of CVR_{E+U} of second and third stage for all the items was calculated, and 8 items (item no. 2, 3, 13, 20, 27, 28, 29 and 34, from the third stage) were omitted owing to their low CVR_{E+U} value. A final valid scale with 26 items was thus finalized for the next level of tests.

**Administration of the Items to a Development Sample**

The scale with 26 items was distributed online as well as in four face-to-face workshops on OER conducted in four different Indian universities. About 30 teachers attended each of the workshops, and we sent the online survey to about 150 OER practitioners on the WikiEducator India list. Tinsley and Tinsley (1987) suggest a ratio of 5 to 10 subjects per item, i.e. up to a sample size of about 300 for factor analysis. Thus, distribution of the questionnaire containing 26 items to a sample size of 270 was considered satisfactory, and a large sample would eliminate subject variance (DeVellis, 2003) for scale development. However, only 117 (43%) usable responses were received. Though this was considered as a limitation at this stage, the analysis of the responses found that this return rate was adequate for this instrument.

Detailed analysis of the psychometric properties of the scale for validity and reliability, including factor analysis, are described in the next section.

**Results and Analysis**

**Validity of Items in the Scale**

In order to examine the validity of ATOER scale, Content Validity Ratio (CVR) was calculated in four stages. Findings and analysis of each stage are discussed below:

First Stage: A total of 19 experts out of 30 responded. However, only 15 responses were found to be complete. On the basis of the data, CVR was calculated to be -0.18, which is very less than
critical value of 0.49 at p<0.05 level for 15 experts (Table 1). The draft thus shaped was termed Draft-I.

Second Stage: Analysis and discussions on Draft-I draws attention to the speculation that respondents might have ranked the items as ‘Useful, but not necessary’ instead of ‘Essential’ without understanding that items ranked as ‘Useful, but not necessary’ will be removed from final scale (Lawshe, 1975). This misperception between ‘Useful, but not essential’ and ‘Essential’, also resulted in low CVR. Therefore in second stage the CVR is re-calculated combining both ‘Essential’ and ‘Useful, but not necessary’ ratings to give a combine value of CVR<sub>E+U</sub> (Kawachi, 2014). The CVR<sub>E+U</sub> of scale is calculated to be 0.62, which is more than critical value of 0.49 at p<0.05 level for 15 experts at 0.05 level. The draft shaped after second stage was termed Draft-II.

Third Stage: Only 4 experts responded at this stage. This low response may have been avoided by providing background of this research study and explaining the three constructs to the experts. However, the validity process expects un-influenced opinion on the items. CVR<sub>E+U</sub> of the revised scale was 0.68. Additionally, the calculated value of CVR<sub>E+U</sub> is 1.00 for most of the new items (Table 1). The draft shaped after this stage was termed Draft-III.

Table 1: Stage-wise Items and CVR

<table>
<thead>
<tr>
<th>Stage-I</th>
<th>Stage-II</th>
<th>Stage-III</th>
<th>Items</th>
<th>CVR (Draft-I)</th>
<th>CVR&lt;sub&gt;E+U&lt;/sub&gt; (Draft-II)</th>
<th>CVR&lt;sub&gt;E+U&lt;/sub&gt; (Draft-III)</th>
<th>CVR Combined II-III stage (Draft-IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>I have prior experience of using OER</td>
<td>0.7</td>
<td>1.0</td>
<td>1.0</td>
<td>0.73</td>
</tr>
<tr>
<td>2†</td>
<td>2†</td>
<td>2†</td>
<td>All teaching resources available on internet are OER</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>–</td>
</tr>
<tr>
<td>3†</td>
<td>3†</td>
<td>3†</td>
<td>All resources are OER such as video, audio, text and so on</td>
<td>0.0</td>
<td>−0.5</td>
<td>−0.5</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td>OER means no need to ask any further permission to use them</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.52</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
<td>OER means the resource is openly licensed</td>
<td>0.8</td>
<td>1.0</td>
<td>1.0</td>
<td>0.81</td>
</tr>
<tr>
<td>6*</td>
<td></td>
<td></td>
<td>OER means learning resource is freely available to be used by anyone</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>7*</td>
<td></td>
<td></td>
<td>OER are digital or non-digital materials that can be re-used for teaching/learning/research</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>8</td>
<td>I have knowledge of Intellectual Property Right to understand OER</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>0.62</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>9</td>
<td>Sharing of educational resources improves my professional respect</td>
<td>0.8</td>
<td>0.5</td>
<td>0.5</td>
<td>0.70</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>10</td>
<td>It gives me pleasure if someone adopt/adapt my educational resources</td>
<td>0.9</td>
<td>1.0</td>
<td>1.0</td>
<td>0.90</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>11</td>
<td>Sharing helps me to get feedback</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Stage-I</td>
<td>Stage-II</td>
<td>Stage-III</td>
<td>Items</td>
<td>CVR (Draft-I)</td>
<td>CVR_E+U (Draft-II)</td>
<td>CVR_E+U (Draft-III)</td>
<td>CVR Combined II-III stage (Draft-IV)</td>
</tr>
<tr>
<td>---------</td>
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<td>----------------------------------------------------------------------</td>
<td>--------------</td>
<td>---------------------</td>
<td>-----------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>12</td>
<td>Sharing enhances my personal and organizational reputation</td>
<td>1.0</td>
<td>0.5</td>
<td>0.50</td>
<td>0.90</td>
</tr>
<tr>
<td>11†</td>
<td>11†</td>
<td>13†</td>
<td>I share resources with trustworthy people</td>
<td>0.1</td>
<td>0.0</td>
<td>0.00</td>
<td>–</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>14</td>
<td>Sharing of educational resources increases my profile amongst peers and others</td>
<td>0.9</td>
<td>0.5</td>
<td>0.50</td>
<td>0.80</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>15</td>
<td>OER increases my network and sphere of influence</td>
<td>0.9</td>
<td>1.0</td>
<td>1.00</td>
<td>0.90</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>16</td>
<td>As a teacher, it is my responsibility to share all educational resources created by me</td>
<td>0.9</td>
<td>0.5</td>
<td>0.50</td>
<td>0.80</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>17</td>
<td>OER helps me to reach out to more students</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>18</td>
<td>OER improves my chance of recognition at global level</td>
<td>1.0</td>
<td>0.5</td>
<td>0.50</td>
<td>0.90</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
<td>19</td>
<td>I believe that sharing educational material as OER will encourage others to do so</td>
<td>1.0</td>
<td>0.5</td>
<td>0.50</td>
<td>0.90</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>20**</td>
<td>Sharing of OER amongst colleagues encourages self-reflection</td>
<td>1.0</td>
<td>–0.5</td>
<td>–0.50</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21*</td>
<td>Sharing enhances my confidence as I see myself in part of larger community</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>22*</td>
<td>When others use my OER, it improves my sense of achievement</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>23*</td>
<td>OER helps to disseminate my ideas</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24*</td>
<td>I can use OER easily due to its reusability</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>25*</td>
<td>I use OER as they are available at reduced cost</td>
<td>0.5</td>
<td>0.5</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>26*</td>
<td>OER are easy to use as they are accessible</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>27**</td>
<td>Sharing of work could expose my deficiencies</td>
<td>0.1</td>
<td>1.0</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>24†</td>
<td>24†</td>
<td>28†</td>
<td>I do not want to undergo any peer inspection</td>
<td>0.4</td>
<td>0.5</td>
<td>0.50</td>
<td>–</td>
</tr>
<tr>
<td>25†</td>
<td>25†</td>
<td>29†</td>
<td>Educational materials developed for my student will not serve any purpose for others</td>
<td>0.4</td>
<td>0.5</td>
<td>0.50</td>
<td>–</td>
</tr>
<tr>
<td>26</td>
<td>26</td>
<td>30</td>
<td>OER promotes collaboration and consortia</td>
<td>0.3</td>
<td>1.0</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31*</td>
<td>I am efficient in Information Communication Technology (ICT) skills to adopt and use OER</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32*</td>
<td>I adopt OER for my teaching as they fulfil academic requirement of my students</td>
<td>1.0</td>
<td>1.0</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Development of a Scale to Measure Faculty Attitude towards Open Educational Resources

Open Praxis, vol. 8 issue 1, January–March 2016, pp. 55–69

<table>
<thead>
<tr>
<th>Stage-I</th>
<th>Stage-II</th>
<th>Stage-III</th>
<th>Items</th>
<th>CVR (Draft-I)</th>
<th>CVR E+U (Draft-II)</th>
<th>CVR E+U (Draft-III)</th>
<th>CVR Combined II+III stage (Draft-IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>33* My own competencies and knowledge towards OER helps me to participate or adopt OER</td>
<td>1.0</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>34** My work gets visible to others, if I use OER</td>
<td>0.0</td>
<td>0.00</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Average CVR Value</td>
<td>-0.18</td>
<td>0.62</td>
<td>0.68</td>
<td>0.88</td>
</tr>
</tbody>
</table>

* Items added in Draft-III  
** Deleted items based on low CVR  
† Deleted items with Negative Statements

Fourth Stage: At this stage, 8 items (item no. 2, 3, 13, 20, 27, 28, 29 and 34, from the third stage) were omitted owing to their low CVR E+U value. The average calculated value of CVR E+U for 26 items was 0.88, which is more than the critical value of 0.42 at p<0.05 level for 20 experts. This was considered to be satisfactory for further statistical tests.

Exploratory Factor Analysis and Reliability of the Scale

The 26-item scale was subjected to reliability test using two methods that showed Cronbach’s alpha at 0.897 and Guttman Split-Half Coefficient at 0.790, which provided confidence that the items in the scale are interrelated and are measuring the same attribute, i.e. Attitude towards OER. With this we were interested in analyzing the three constructs of the scale: Awareness, Sharing and Adaptation.

Before undertaking factor analysis, we conducted Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy. Kaiser (1974) recommended that KMO values between 0.8 and 0.9 are great, and Table 2 shows KMO value of 0.82 for the data used in the study. This gives confidence that the sample size is adequate for factor analysis. Also, the Bartlett’s test of Sphericity reveals that it is highly significant (p<.001), indicating that there are some relationships between the variables.

Table 2: KMO and Bartlett’s Test

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | .823 |
| Bartlett’s Test of Sphericity | Approx. Chi-Square | 1.239E3 |
| Df | 325 |
| Sig. | .001 |

Factor analysis of the 26-item scale using principal component analysis method assuming three factors confirmed the assumption showing only 21 items with factor loading more than 0.5 or greater. Table 3 shows the 21 items with factor loading ranging from 0.528 to 0.798. The Cronbach’s alpha for the scale at this stage was 0.887.
### Table 3: Three Factors of the Attitude towards OER Scale

<table>
<thead>
<tr>
<th>The Item Statements</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharing of educational resources improves my professional respect</td>
<td>0.504</td>
<td>0.215</td>
<td>0.214</td>
</tr>
<tr>
<td>It gives me pleasure if someone adopts/adapts my educational resources</td>
<td>0.593</td>
<td>0.086</td>
<td>0.341</td>
</tr>
<tr>
<td>Sharing helps me to get feedback</td>
<td>0.643</td>
<td>–0.031</td>
<td>0.234</td>
</tr>
<tr>
<td>Sharing enhances my personal and organizational reputation</td>
<td>0.717</td>
<td>0.065</td>
<td>0.182</td>
</tr>
<tr>
<td>Sharing of educational resources increases my profile amongst peers and others</td>
<td>0.577</td>
<td>0.153</td>
<td>0.195</td>
</tr>
<tr>
<td>OER increases my network and sphere of influence</td>
<td>0.688</td>
<td>0.123</td>
<td>0.106</td>
</tr>
<tr>
<td>As a teacher, it is my responsibility to share all educational resources created by me</td>
<td>0.510</td>
<td>0.257</td>
<td>0.143</td>
</tr>
<tr>
<td>OER improves my chance of recognition at a global level</td>
<td>0.745</td>
<td>0.244</td>
<td>–0.036</td>
</tr>
<tr>
<td>I believe that sharing educational materials as OER will encourage others to do so as well</td>
<td>0.696</td>
<td>0.238</td>
<td>–0.009</td>
</tr>
<tr>
<td>Sharing enhances my confidence as I see myself in part of larger community</td>
<td>0.666</td>
<td>0.166</td>
<td>0.128</td>
</tr>
<tr>
<td>When others use my OER, it improves my sense of achievement</td>
<td>0.648</td>
<td>0.154</td>
<td>0.142</td>
</tr>
<tr>
<td>OER helps to disseminate my ideas</td>
<td>0.619</td>
<td>0.184</td>
<td>–0.004</td>
</tr>
<tr>
<td>OER promotes collaboration and consortia</td>
<td>0.576</td>
<td>0.468</td>
<td>–0.048</td>
</tr>
<tr>
<td>I have prior experience of using OER</td>
<td>–0.174</td>
<td>0.620</td>
<td>0.025</td>
</tr>
<tr>
<td>I have knowledge of Intellectual Property Rights to understand OER</td>
<td>0.196</td>
<td>0.541</td>
<td>0.163</td>
</tr>
<tr>
<td>I am efficient in Information Communication Technology (ICT) skills to adopt and use OER</td>
<td>0.230</td>
<td>0.682</td>
<td>–0.018</td>
</tr>
<tr>
<td>I adopt OER for my teaching as they fulfil academic requirement of my students</td>
<td>0.240</td>
<td>0.591</td>
<td>0.275</td>
</tr>
<tr>
<td>My own competencies and knowledge towards OER helps me to participate or adopt OER</td>
<td>0.243</td>
<td>0.700</td>
<td>0.150</td>
</tr>
<tr>
<td>OER means no need to ask any further permission to use them</td>
<td>–0.040</td>
<td>0.123</td>
<td>0.696</td>
</tr>
<tr>
<td>OER means the resource is openly licensed</td>
<td>0.054</td>
<td>0.022</td>
<td>0.725</td>
</tr>
<tr>
<td>OER means the learning resource is freely available to be used by anyone</td>
<td>0.176</td>
<td>0.064</td>
<td>0.607</td>
</tr>
<tr>
<td>Cronbach's alpha (Factors)</td>
<td>0.898</td>
<td>0.734</td>
<td>0.626</td>
</tr>
<tr>
<td>Cronbach's alpha</td>
<td></td>
<td>0.887</td>
<td></td>
</tr>
</tbody>
</table>
Scale Optimization

The correlation between these three factors (Table 4) revealed that factor 1 and 2 is positively correlated with moderate coefficient value 0.46, which is also significant at 0.01 level. On the other hand, factor 3 has a very low correlation with both factor 1 and 2. Cronbach’s alpha for factor 1 is 0.89, which is good enough. Furthermore reliability coefficient of factor 2 and 3 are measured as 0.71 and 0.61 respectively. Thus, the correlation between all these factors and the reliability coefficient revealed that factor 3 is not correlated with factor 1 and 2; however, the Cronbach’s alpha with 0.61 is acceptable but not good enough. Because of this, we decided to discard the factor 3 (with 3 items) from the scale.

Table 4: Correlations between three factors

<table>
<thead>
<tr>
<th>Factor 1 (Sharing)</th>
<th>Factor 2 (Adaptation)</th>
<th>Factor 3 (Awareness)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.466**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>Factor 2 (Adaptation)</td>
<td>Pearson Correlation</td>
<td>.231*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.012</td>
</tr>
<tr>
<td>Factor 3 (Awareness)</td>
<td>Pearson Correlation</td>
<td>.169</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.069</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Once it was decided to use the two factors with 18 items, we conducted inter-item correlation for both factors (sub-scales). The standardized Cronbach’s alpha for the 13 items in the Sharing scale was 0.898, while for the five items Adaptation scale was 0.734. In Tables 5 and 6, the values in the column labelled Corrected Item-Total Correlation are the correlations between each item and the total score from the questionnaire. In a reliable scale all items should correlate with the total. We used the advice of Field (2009) to look for items with less than 0.3 to identify, if any item does not correlate very well with the overall scale. Interestingly for all the items, item-total correlations are above 0.3.

Table 5: Inter-item Correlation — Sharing of OER Sub-scale

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale Mean if Item Deleted</th>
<th>Scale Variance if Item Deleted</th>
<th>Corrected Item-Total Correlation</th>
<th>Squared Multiple Correlation</th>
<th>Cronbach’s Alpha if Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q7</td>
<td>52.6838</td>
<td>34.942</td>
<td>.499</td>
<td>.364</td>
<td>.889</td>
</tr>
<tr>
<td>Q8</td>
<td>52.5726</td>
<td>35.195</td>
<td>.564</td>
<td>.443</td>
<td>.887</td>
</tr>
<tr>
<td>Q9</td>
<td>52.6410</td>
<td>34.663</td>
<td>.560</td>
<td>.478</td>
<td>.887</td>
</tr>
<tr>
<td>Q10</td>
<td>52.7265</td>
<td>33.287</td>
<td>.688</td>
<td>.532</td>
<td>.881</td>
</tr>
<tr>
<td>Q11</td>
<td>52.8974</td>
<td>33.041</td>
<td>.571</td>
<td>.447</td>
<td>.886</td>
</tr>
<tr>
<td>Q12</td>
<td>52.8034</td>
<td>32.556</td>
<td>.656</td>
<td>.500</td>
<td>.882</td>
</tr>
</tbody>
</table>
Once we were confident about the sub-scales, we conducted inter-item correlation for all the 18 items in the scale, and only one item showed correlation value of less than 0.3 (i.e. item 1 from the sub-scale Adaptation, with 0.170). Further, the result indicated that deleting the item from the scale would increase the reliability score to 0.897. Therefore, the final number of items in the scale is 17 (with 13 items for Sharing and 4 items for Adaptation). For the sub-scales, the reliability co-efficient (Cronbach’s α) is 0.893 and 0.715 for Sharing and Adaptation, respectively.

**Confirmatory Factor Analysis**

While the optimization process and reliability tests revealed a 17-item scale with high validity and reliability, we also conducted Confirmatory Factory Analysis (CFA) on the data set, as in the beginning we had assumed three factors based on literature review and conducted the exploratory factory analysis. The process of scale development resulted in a two-factor scale, and we wanted to analyse if the two-factor model is a good fit. Thus, we followed Structural Equation Modelling (SEM) using SPSS AMOS. The SEM is used commonly to test whether measures of a construct are consistent with the researchers’ assumption of the nature of the construct. Figure 1 shows the Path diagram of the CFA, which shows that the two constructs (sharing and adaptation) are correlated. There are several ways of determining model fit, and the common measure is to follow the chi-square ($\chi^2$) goodness of fit. In this case the $\chi^2$ value of 204.548 at 118 degree of freedom is high rejecting the model fit. However $\chi^2$ is affected by the sample size, therefore $\chi^2$/df ratio, which in this case is 1.73, is used as a measure of good fit. Kline (2005) recommended that as a rule of thumb, $\chi^2$/df values of 3.0 or less signify a good fit of the model. We further used the Root Mean Square Error Approximation (RMSEA) statistics for analyzing the model fit. For RMSEA, choosing a proper cutoff
value is critically important, and a widely used convention is that ≤0.05 refers to close fit, ≤0.08 mediocre fit, and > 0.10 poor fit (see, e.g., Browne & Cudeck, 1992; MacCallum, Browne & Sugawara, 1996). For our data the RMSEA value is 0.08, which indicates the model presents a mediocre fit and the proposed two-factor model is plausible.

![Path Diagram of the Model](image)

**Figure 1: Path Diagram of the Model**

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>204.548</td>
</tr>
<tr>
<td>DF</td>
<td>118</td>
</tr>
<tr>
<td>Significance</td>
<td>0.001</td>
</tr>
<tr>
<td>CMIN/DF</td>
<td>1.733</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.080</td>
</tr>
</tbody>
</table>

**Discussion and Conclusion**

The development of ATOER scale with 17 items and two factors (Appendix 1) following a consultative process with valid and reliable statistics shows that the scale can be used to measure what it is supposed to measure, i.e. attitude towards OER. While we started the analysis with only 117 responses, and considered it may be a limitation, the final scale with 17 items satisfactorily falls within the acceptable limit of sample size (Tinsley & Tinsley, 1987). The CVR score for the final scale is 0.9, and the Cronbach’s reliability co-efficient $\alpha$ is 0.897.

It is interesting to note that, based on the literature review, we assumed a three-factor model of attitude towards OER, and during the reliability tests, we dropped the items related to awareness. In retrospect, this looks obvious as mere awareness may not have influence on the overall attitude, and those sharing and adaptation behaviour are certainly manifestation of attitude towards OER.
This has significance for the OER practitioners, as only advocacy and increasing awareness of OER may not help promote the cause of OER.

The two-factors model using the data in the study revealed a mediocre fit, and therefore, we proffer that the scale is acceptable on the basis of its other psychometric properties. However, further tests may be needed with more data and other contexts to test the model fit. We could have further conducted modification indices to come-up with an acceptable model fit. However, as the exploratory factor analysis and reliability tests are sufficient for any scale development, we assume that the mediocre fit presents a plausible model that could be further tested by other researchers using the scale developed in this study.

In order to use the scale in practice, several demographic variables may be used to understand difference due to gender, experience, age, discipline, etc. However, the important use of the scale would be to know how a group of teachers in an educational institution are disposed to OER, and therefore, whether they would take steps to use and contribute to OER. The development of the scale is within the context of a wider research being currently conducted to understand why some teachers share their work and others do not. As such, one of the ways the scale would be used is to explore the possibility of predicting who would be more willing to share educational materials with open license. When used with other psychological aspects, such as motivation of individuals, the scale might help to demonstrate better results related to who would share learning materials. However, institutional policies may also have some impact on sharing behaviour, while individuals may have positive attitudes.

Generally there is an inherent assumption in attitude measurement that we may reasonably expect respondents to accurately reflect their own held beliefs (Thurstone, 1938). In attitude studies, ‘social desirability’ aspect of the respondents to show a positive disposition may also influence the outcome of the scale, and could be investigated by adding a ‘social desirability scale’ such as that developed by Strahan and Gerbasi (1972) alongside the present 17-item ATOER. While the methodology of the scale development shows the rigor, investigation on a larger or different sample may be warranted to further validate the scale.

The scale will help institutions to plan use of OER in teaching and learning by identifying positive and negative faculty attitudes. Policy makers and planners will be in a better position to manage change and implement an organization-wide OER strategy with an empirical understanding of the ground realities. As attitudes naturally change over time, it is possible for institutional administrators to change any negative pre-disposition among faculty through interventional information communication, training and implementing projects related to OER.

Acknowledgement

This work was carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada.

References


Appendix 1: ATOER Scale

This *Attitude towards Open Educational Resources* (ATOER) scale is intended to assess attitude towards OER. Please indicate your level of agreement or disagreement by putting a ✓ mark in the appropriate column. SA = Strongly Agree, A = Agree, UD = Un-decided, D = Disagree and SD = Strongly Disagree.

<table>
<thead>
<tr>
<th>Items</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharing of educational resources improves my professional respect</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It gives me pleasure if someone adopts/adapts my educational resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharing helps me to get feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharing enhances my personal and organizational reputation</td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>OER increases my network and sphere of influence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As a teacher, it is my responsibility to share all educational resources created by me</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>OER improves my chance of recognition at a global level</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>I believe that sharing educational materials as OER will encourage others to do so as well</td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Sharing enhances my confidence as I see myself in part of larger community</td>
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<td></td>
<td></td>
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<tr>
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<tr>
<td>OER helps to disseminate my ideas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OER promotes collaboration and consortia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have knowledge of Intellectual Property Rights to understand OER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am efficient in Information Communication Technology (ICT) skills to adopt and use OER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I adopt OER for my teaching as they fulfill academic requirement of my students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My own competencies and knowledge towards OER helps me to participate or adopt OER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Book review of Integrating Pedagogy and Technology: Improving Teaching and Learning in Higher Education


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Introduction

Technology applied in university courses must also include pedagogical rationale to be most effective. Likewise, faculty that are only using pedagogy and not including current technology are not fully preparing their students for careers beyond their undergraduate studies. Bernauer and Tomei aim to help college professors become master educators by fully utilizing both technology and pedagogy in unison. To that end, they have created a framework for faculty and an impressive list of tools with pre-identified objectives. The matrix introduced in this book has the potential to serve as an instructor evaluation in higher education.

The authors divided the book into four sections designed to guide both new and experienced professors through strategies of pedagogy and technology integration. The sections are (a) Foundations of Teaching and Learning in Higher Education, (b) Taxonomies of the Domains of Learning, (c) The Integrated Readiness Matrix, and (d) Putting it All Together and Capacity Building. The chapter format of the text follows solid lesson delivery construction with Advance Organizers, Content, Summary, Terms, Discussion Questions, References, and Suggested Readings.

Content

Part 1: Foundations of Teaching and Learning in Higher Education

The text begins by comparing high school teachers to college professors, including their background experiences prior to their teaching careers. The authors have contrasted the two in such a way by inferring that high school teachers have more preparation in pedagogical methods and thoughts, whereas the college professor is the content specialist.

To assist college professors in further understanding pedagogical background and research, the authors present an overview of five schools of educational psychology: Behaviorism, Cognitivism, Humanism, Constructivism, and Connectivism. Included in this portion of the text is a useful questionnaire to aid the reader in self-identifying with one of these five schools of thought. There is a summative table displayed at the end of this section that portrays a useful comparison of the characteristics of each school and their best practices.
Part 2: Taxonomies of the Domains of Learning

To assist professors in developing a framework for effective teaching, the authors have selected and summarized four taxonomies. The taxonomies included are Maslow’s Hierarchy of Human Needs, Kohlberg’s Stages of Development, Erikson’s Theory of Human Development, and Marcia’s Concept of Human Identity. Each taxonomy is presented and related to learning theories as it would apply in higher education.

Part 3: The Integrated Readiness Matrix

In a similar method to how employed professionals and their managers have utilized taxonomies in industry, college professors need a scale to measure the effectiveness of their course methodologies. Bernauer and Tomei selected two specific taxonomies for the measurement tools of their Integrated Readiness Matrix (IRM). Bloom’s revised taxonomy serves as the cognitive domain and functions as the Y-axis of the IRM. The X-axis is Tomei’s taxonomy for the technology domain. The authors argue that faculty are most effective when they are operating at the top of both taxonomies and have reached the “master integrator” quadrant of the matrix. To aid the reader in envisioning the use of the IRM, a sample professor identifies their current section of the IRM via the provided questionnaire.

In addition to pinpointing where a professor would fall on the IRM, there is also the expectation that the professor would develop strategies to advance further along the domains. This is perhaps the most beneficial aspect of this book as the authors have provided approximately 170 objectives for each pedagogical and technological domain level on the IRM. Each quadrant is broken down with learning objectives listed in application format directed at the college course. As a means for further discovery and collaboration, readers that have additional lesson ideas are invited to share those ideas with the authors for future publication.

Part 4: Putting it All Together and Capacity Building

The text concludes with a call to action for college faculty to further integrate technology into the pedagogical practices of their classes. While instructors at all levels should continually strive to become educators that are more efficient, universities have a responsibility to assist faculty in reaching that goal.

Conclusion

This book significantly contributes to the art of teaching with technology as it offers a practical list of resources that can increase the efficacy of university professors. I would recommend this book to those involved with instructional design, educational technology, or faculty development at the university level. Faculty would need to understand the teaching and learning of foundational content at the beginning of the book prior to self-identifying and advancing on the IRM scale. The reader would benefit further with the future inclusion of a blank IRM Questionnaire for self-reflection. However, the tools presented in the text could help individuals in faculty development roles while planning and designing program themes and resources. The book has the potential to function as a training guide for higher education teaching and learning centers.
Book Review of The New Digital Shoreline: How Web 2.0 and Millennials are Revolutionizing Higher Education


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In higher education, the integration of new technologies and pedagogies of instruction is often a source of apprehension. The New Digital Shoreline, written by Roger McHaney of Kansas State University, is a guide for understanding millennial learners along with current technologies and strategies used in college classrooms. The audience for this book would likely be faculty and administrators with limited knowledge of the shifting expectations for technology in higher education. On the spectrum of technology adoption ranging from innovators to laggards, The New Digital Shoreline is best suited for late majority adopters. The book is organized around the metaphor of exploring a new world, one with an unfamiliar population, landscape, and culture; the author is your guide on a journey to successfully adapt to the realities of this new world.

In Chapter 2, “Indigenous Populations on the Shoreline”, McHaney describes tech-savvy millennials and their preferences for engaging with learning technologies. There is a tendency in popular media to stereotype millennials, but the author is careful to provide helpful insights without overgeneralizing this diverse generation of learners. In this chapter, McHaney also introduces the idea of “time-slicing.” Millennial students are often categorized as multi-taskers, diluting their short attention spans between many digital distractions. Instead of multi-tasking, McHaney believes students may be time-slicing, or shifting attention quickly between tasks, continually re-prioritizing but focusing on one task at a time. Suggestions are provided on how instructors can help students manage time-slicing in an environment where learners must sift through continuous streams of information. McHaney also believes instructors should design learning experiences to help students foster skills needed to search for information from a variety of places rather than focusing on memorization of information. Educators must determine which skills and abilities are important and transferrable and which can be ceded to technology (p. 51–53). This chapter’s section on “Higher Education’s Opportunity with Tech-Savvy Millennials” provides solid advice to help faculty reframe how they approach teaching upcoming generations of learners.

Chapters Three, Four, and Five introduce a variety of educational technologies. Chapter Three explores platforms and environments for learning. Chapter Four focuses specifically on how Web 2.0 and social technologies affect the learning environment, while Chapter Five provides suggestions on how to harness Web 2.0 content and applications in the classroom. A lot of time is spent in these chapters explaining specific technologies. While admittedly helpful for novices, these chapters will likely be of less interest to those with a decent understanding of current technologies. McHaney
examines the pedagogy behind the tools but spends too much time explaining the many specific tools and providers. Like any book that describes current technologies, this information will become outdated as tools and trends evolve. Despite these criticisms, the author still makes a number of salient points. Especially important is McHaney’s emphasis on the fundamental transformation underlying the use of educational technologies.

Chapters Six and Seven continue with advice on how faculty can change their instructional strategies to better align with student expectations and evolving pedagogies. McHaney encourages the rebuilding of higher education in response to its changing environment as he shares a narrative about the rebuilding of small town after development of a flood dam. Millennial students expect their classroom experience to prepare them for a job market which is increasingly global, interconnected, and technologically enabled (p. 156). Chapter Seven gets to the heart of how recent changes in technology have gone hand-in-hand with new approaches to teaching and learning. A helpful chart on pages 177 and 178 outlines different learning theories as they relate to millennial students. Examination of the connectivist classroom is especially critical for instructors who may desire to build upon students’ natural tendencies to learn through “networks of friends, online searches, communities of practice, and through social networking” (p. 146). McHaney also points out how various technologies can support different learning theories. The book concludes with Chapter Eight, and the section titled “Coping As a Teacher” leaves the readers with next steps for how to begin exploring the new digital shoreline.

*The New Digital Shoreline*’s exploration of millennial learners and the evolution of educational technology and pedagogy is relevant for both face-to-face and online educators. McHaney believes higher education’s “long statistical tail” may increase the market for distance learning, especially offerings by reputable universities and professors, leading to increased competition based on niche factors and costs (p. 205–207). McHaney states, “It is almost certain that, in decades to come, our linear educational systems will be replaced with nonhierarchical structures marked by self-directed, individualized, and customized learning experiences that draw on multiple resources” (p. 213). Key insights for educators can be found in the author’s examination of the inextricable co-evolution of society and education. McHaney succeeds in grounding each conversation with practical advice on how faculty can adapt to technologies, instructional strategies, and students found on the new digital shoreline of higher education.

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