INTERNATIONAL JOURNAL

OF

INSTRUCTIONAL TECHNOLOGY

AND

DISTANCE LEARNING

PUBLISHER'S DECLARATION

International Journal of Instructional Technology & Distance Learning

Vol. 13. No. 10.

ISSN 1550-6908

Table of Contents – October 2016

Editorial

"Exceeds all expectations"
Donald G. Perrin

This little piece of history shows how technology served industry and academia in the 1990s.

In the early 1990's, Silicon Valley companies determined that training in *quality improvement* was essential to their future success. They prepared a list of courses and possible instructors from within their ranks and approached San Jose State University (SJSU) to manage the program on their behalf. SJSU had just installed state of the art television facilities that could broadcast to satellite campuses and industry training rooms that were suitably equipped. They used Instructional Television Fixed Service (ITFS), a low-cost microwave broadcasting system licensed by the Federal Communication Commission (FCC) for educational use.

The program was assigned to Dr. Elizabeth Perrin, who developed an ITFS program in Engineering for the California State University (CSU) Northridge. Four studio-classrooms broadcast classes to the entire Los Angeles region from Mount Wilson. A microwave network extended this throughout Southern California and joined to a network developed by CSU Chico in Northern California. There was high demand for these courses for industry and on military bases such as China Lake.

The studio classrooms at SJSU seated 50 students and the broadcast signal could reach up to a 50 mile radius. Multiple cameras presented audiovisual materials. One camera used a radio signal to track the instructor. There was also an uplink from the internet to the instructor console. Remote classrooms had talk-back built in so they could ask questions and participate in discussions.

Dr. Perrin requested a two-year loan of $40,000 from the Dean for Continuing Education to launch a certificate program in Total Quality Management. The loan was repaid after two months.

Enrollment was large. Almost 200 students enrolled to take the course on campus, four times the capacity of the studio classroom. Warnings that classroom capacity was exceeded were disregarded. If people needed this class, they would not be turned away. On the first night of class, guides diverted the overflow to classrooms with television receivers and refreshments. Participants were assured that the enrollment problem would be solved in the break period. Many attendees decided that the televised instruction was more than adequate and that their industry training rooms with talkback would be better than fighting congestion on the freeways and parking lots. In the break period, 100 people volunteered to take the class remotely. The remainder divided down the middle to take classes at 4:00pm or at 7:00pm and the instructors agreed to teach each class twice.

Needless to say, the instructors were spectacular - among the best to be found anywhere - and support personnel were always ready to help. If you were out of town to attend a meeting, a personal copy of the videotape was yours for a few dollars. There was a 98% graduation rate of those who attended the first night. The formal graduation party was the first time many participants met their instructor – and each other. And there was a bonus. The School of Business was impressed with the courses – and the participants. They offered to accept the continuing education units toward undergraduate or graduate programs in the School of Business.

The program ran for more than five years. Subsequent advances in technology provided inexpensive and efficient ways to transmit classes via the internet. Today, the instructor can do lecture-demonstrations and discussions from a desktop computer, laptop or tablet. The concept of a television studio or studio classroom has largely disappeared.

Viewing Quality Matters
from Boyer's Scholarship Paradigm

Prince, B.F., Snyder, J.L., Kanekar, A. and Lipscomb, S.R.
USA

Abstract

Online education is a controversial concept in the land of academia, which is historically full of tradition. Many of our higher education institutions are not willing to let go of the traditional concepts and policies that currently exist, thereby fostering apprehensiveness in embracing change. Advancing technologies for synchronous and asynchronous course instruction continue to challenge higher education leaders. Despite institutions of higher education resolving numerous issues of faculty concerns in online programs such as workloads, training, and research opportunities, higher education leaders today may find the new paradigm of online course instruction difficult to merge with traditional policies that exist at many institutions as it relates to scholarship of discovery among faculty members. The authors have investigated the melding of the Quality Matters process of fully online and blended course assessments into a broader view of the Boyer model of Scholarship.

Keywords: Quality Matters, higher education leadership, Boyer's model 1990, online teaching, scholarship of teaching, scholarship of discovery, tenure and promotion, online course development, Boyer's model 1996, peer review process.

Introduction

The commitment that faculty must make to the quality of advancement and scholarship of discovery, should allow one to use their creative understanding to transform this area of the Boyer's Model (1990). Quality assurance supports the systematic process one must go through to achieve reliability of data and the best practices of using online education to advance knowledge, freedom of inquiry, and investigation. (Rouse, 2011).

The authors of this investigation are exploring the Quality Matters (QM) process of fully online and blended course assessment and its integration into the Boyer's (1990) scholarship system. The process of tenure track faculty pursuing quality in teaching, scholarship, and service can be a controversial issue (Boyer, 1990). Should the process of becoming tenured be of a traditional scripted nature teaching versus research debate or can one consider the paradigm of scholarship from a broader perspective?

The specific topics that are traditionally considered under the scholarship of discovery and integration are: peer reviewed publications, writing peer-reviewed book chapters, and new and creative works that bring new insight on original research. "Today, more than at any time in recent memory, researchers feel the need to move beyond traditional disciplinary boundaries, communicate with colleagues in other fields and discover patterns that connect" (Boyer, 1997, p. 20). Can assessing the quality of scholarship be reproduced through the Quality Matters national benchmark peer review process for fully online and blended courses?

Overview of Quality Matters process

Quality Matters (QM) is a faculty-centered, peer review process designed to certify the quality of online and hybrid/blended courses. Quality Matters (QM) is a leader in quality assurance for online education and has received national recognition for its peer-based approach and continuous improvement in online education and student learning (Quality Matters Program, 2016). With a central focus on course design, the Quality Matters (QM) Rubric was developed on evidence-based research, sound instructional design principles and industry best practices (Quality Matters, 2016) and is reviewed periodically for continuous improvement.

Upholding the Boyer's scholarship model for higher education, Quality Matters can be considered as 'scholarship of application (practice) and integration as 'course evaluation' using its rubric involves collaboration of peer-reviewers across disciplines (Shattuck, Zimmerman & Adair, 2014). Evidence-based practices, deployed by the Quality Matters, revolves around eight general standards: course overview and introduction, learning objectives (competencies), assessment and measurement, instructional materials, course activities and learner interaction, course technology, learner support and accessibility and usability (Ralston-Berg, 2015; Shattuck, 2013). A primary focus of the rubric is the concept of alignment in which core course components are balanced in support of the stated learning objectives. The 2014 rubric contains eight general categories, forty-three specific standards, and can be used as a tool for course review as well course development.

Quality Matters (QM) Eight General Standards:

1. Course Overview and Introduction
2. Learning Objectives (Competencies)
3. Assessment and Measurement
4. Instructional Materials
5. Course Activities and Learner Interaction
6. Course Technology
7. Learner Support
8. Accessibility and Usability

Employing a peer review process Quality Matters (QM) maintains a list of certified QM Peer Reviewers eligible for assignment to a peer review team (Quality Matters, 2016b). The peer-review process means faculty work with one another across institutions to understand best practices and design principles related to online and blended courses. Subscribing institutions may conduct internal or informal reviews or contract with Quality Matters to conduct an official review (Quality Matters, 2016b).

There are two approaches to course review using Quality Matters (QM) Standards - unofficial (internal) reviews and official reviews, which are distinguished by whether or not they are recognized by Quality Matters (QM). An official review affords faculty the opportunity to seek peer-to-peer feedback in the continuous improvement of online and blended courses along with certification of meeting Quality Matters Standards of best practices. Online and Blended courses seeking official course review are required to meet the following criteria:

- Use of current QM Standards
- Review of online or blended (hybrid) course
- Three-person peer review team
- All reviewers are eligible QM-Certified Peer Reviewers
- At least one reviewer is external to the institution submitting the course

- At least one reviewer is designated as subject matter expert
- Team Chair is a QM Master Reviewer (Quality Matters, 2016b)

Faculty may seek Quality Matters certification for any course previously taught fully online or in a blended format. Prior to submitting the Course Worksheet it is suggested that faculty conduct a review of their course using the Self Review tool in QM's Course Review Management System (Quality Matters, 2016c). As noted above, the review team consists of a subject matter expert, an external reviewer, and a team chair that is a QM Master Reviewer. Official Quality Matters course review is a three-stage process, which consists of pre-review, review period, and post review. Pre-review begins once the application for review has been submitted and allows for time for the QM coordinator to complete the following: 1) provide instructions to the Course Representative (requesting faculty) to complete the Course Worksheet, 2) select a review team, and provide the review team with access to the course (Quality Matters, 2016c). During the review-period, which is scheduled for 4-6 weeks (3 weeks for actual review of the course), the review team convenes for pre and post review conference calls. The Team chair submits a final report and notifies the course representative regarding the review outcome (Quality Matters, 2016c). Post-review is the final step of an official Quality Matters Course Review and allows an opportunity for faculty to make amendments to the course as required, based on the review results. The Team Chair reviews and approves any changes to the course. Quality Matters recognition is provided to the Course and added to the Quality Matters online registry once the standards have been met (Quality Matters, 2016c).

By undergoing a Quality Matters review of their course whether officially or not, faculty can improve their course and gain additional skills for designing and administering online and/or blended courses in various learning management systems.

Overview of Quality in Scholarship and in the Scholarship of Teaching

As educators have begun to embrace the shift of higher education into online classrooms many often question the quality of the classes being instructed. Researchers Budden & Budden (2013) agree that such online classes are part of the norm and will only make further inroads into the academe and recommend that universities should strive to find convenient and helpful programs to ensure quality and consistency among online offerings. The demand for online education is at an all-time high. Online enrollments have continued to grow at rates far in excess of the total higher education student population, with the most recent data demonstrating no signs of slowing (Allen & Seaman, 2010). Therefore, institutions should strive to ensure that quality remains a priority despite the mode of course instruction.

The important role that quality and consistency plays in the learning environment cannot be over emphasized. Certification and adherence to standards should be encouraged and rewarded (Budden & Budden, 2013). Majority of the faculty who teach online would likely concur given the hours of time and effort it takes to develop a quality online course. Hofmeyer, Newton & Scott (2007) collectively recommends structural and process change in faculty merit, tenure, and promotion systems so that scholars with varied academic portfolios are valued and many forms of academic scholarship are sustained. It is vital that academic institutions remain relevant in an era when the production of knowledge is increasingly recognized as a social collaborative activity. This leads to the consideration of redefining what constitutes 'scholarship' as it relates to tenure and promotion activities. This fosters a closer examination of how online course development can be viewed as a form of scholarship among faculty who has the desire to be creative, innovative, and strives to enrich their online classrooms with a best practices approach.

Expanding the 'definition of scholarship' not only allows rewards to traditional research scholars but also enfranchises many fine faculties whose work is in the areas of application or engagement. It also gives room and encouragement for those scholars who truly wish to

understand, expand, and enrich teaching in their disciplines (Glassick, 2000). This may include faculty focusing on developing online peer-reviewed Quality Matters (QM) courses (Quality Matters, 2016c) to provide students with enhanced learning experiences. While the QM course peer review process supports an aspect of course development as it relates to teaching, the QM course peer review process also mirrors scholarship. Yet, many faculty are not rewarded the scholarly respect of such endeavors. Boyer often has challenged the 'teaching verses research debates' by advocating for the scholarship of discovery, teaching, integration, and application (Hofmeyer, Newton & Scott, 2007) which aligns with the changes in faculty responsibilities including online course development.

According to Smith, Hollerbach, & Donato, Edlund, Atz, & Kelechi (2016) a critical component of the progression of a successful academic career is being promoted in rank. Early-career faculties are required to have an understanding of appointment, promotion, and tenure (APT) guidelines, but many factors often impede this understanding, thwarting a smooth and planned promotion pathway for professional advancement. Therefore, embracing Boyer's (1990) model of scholarship in higher education will help institutions of higher education foster its acceptance of the diversity that exist as it relates to innovative scholarship endeavors among faculty as it relates to online education. The Quality Matters Program, focusing on quality standards for online course design and a peer-based, course review process, is one manifestation of the response to this need. Given the resources and time required to make the Quality Matters process work, it is important to validate its positive impact on those who participate, on the design of courses and on student success (Legon & Runyon, 2007).

Overview of Boyer's scholarship system

Boyer's (1996) model of scholarship is an academic model advocating expansion of the traditional definition of scholarship and research into four types of scholarship. Boyer first introduced the scholarship domains in 1990. According to Boyer (1990), traditional research, or the scholarship of discovery, had been the center of academic life and crucial to an institution's advancement but it needed to be broadened and made more flexible to include not only the new social and environmental challenges beyond the campus but also the reality of contemporary life. Boyer's (1996) vision was to change the research mission of universities by introducing the idea that 'scholarship' needed to be redefined.

Boyer (1996) proposed that scholarship include these four different categories:

- The scholarship of discovery that includes original research that advances knowledge;

- The scholarship of integration that involves synthesis of information across disciplines, across topics within a discipline, or across time;

- The scholarship of application (also later called the scholarship of engagement) that goes beyond the service duties of a faculty member to those within or outside the University and involves the rigor and application of disciplinary expertise with results that can be shared with and/or evaluated by peers; and

- The scholarship of teaching and learning that the systematic study of teaching and learning processes. It differs from scholarly teaching in that it requires a format that will allow public sharing and the opportunity for application and evaluation by others.

Boyer's (1996) model has been embraced across academia with occasional refinement, such as specific applications for different disciplines.

The Glassick (2000) article analyzed the issue of measuring the quality of scholarship and how it is sustained. The Carnegie Foundation Scholars (1994) identified six standards of assessing the Quality of Scholarship. These are: clear goals, adequate preparation, appropriate methods,

significant results, effective presentation, and reflective critique. These six standards can be applied to all four forms of scholarship proposed by Boyer (1996). The debates began immediately and a variety of higher education institutions found the expansion of the definition of scholarship an attractive innovation. Several colleges and universities have already adapted or amended Boyer's (1996) proposal. The process of adoption of scholarship change has proved hard to deviate from the traditional Boyer (1990) domains of scholarship.

Discussion of merged QM and Boyer's scholarship system

Boyer (Bailey, & Monroe, 2013; Boyer, 1990) in his 'Scholarship Reconsidered' mentioned and described various kinds of faculty scholarship areas such as 'scholarship of discovery', 'scholarship of integration', and 'scholarship of application' and 'scholarship of teaching'. The Quality Matters Program is a faculty centered peer-review process that is designed to certify the quality of fully online and blended courses. Based on the previous sections, an interesting question to be considered here is whether the process of getting a course designed based on Quality Matters Course design guidelines and in turn Quality Matters certified is a form of 'scholarship'?

As per the definition of Schulman (2004), an act of intelligence becomes 'scholarship' if it fulfills three criteria a) it must be made public, b) it should be critically evaluated by one's peers and c) one's community must be able to build upon it (Ochoa, 2011) Although Boyer describes various domains of faculty scholarship, an overlap certainly does and should exist as faculty work often transcends rigid boundaries (Starr-Glass, 2011). In a classic article, Hutchings & Schulman (1999) describe the difference between 'scholarship of teaching and learning (SoTL)' and 'scholarly teaching' is that SoTL work involves 'systematic investigation of questions related to student learning to not only improve the faculty classroom teaching but also beyond it'.

While Quality Matters faculty-centered peer-review process addresses one criterion mentioned by Schulman, the other two are debatable. Quality Matters review process certainly makes faculty members systematically look at their courses and the course elements closely and improve greatly on the course design process it could fail short of additional criteria to be termed 'scholarship'. As noted earlier, although proponents of Quality Matters Program have deemed the continuously evolving process of refining course design rubric as 'scholarship of integration' and 'scholarship of application' (Shattuck, Zimmerman & Adair, 2014), a distance learning or a hybrid course undergoing an informal or a formal peer review has its own limitations when deemed fit to be in a 'Boyer area of scholarship'. This certainly is a contentious issue and needs to be debated and discussed by faculty across various higher education institutions. Quality matters Program and the faculty centered course review process could certainly be considered as ' scholarly teaching' - which is defined as grounding one's teaching practice based on scholarly literature and less than 'scholarship of teaching' which leaves it in a unique position at the intersection of what constitutes 'dimensions of activities related to teaching' (Kern, Mettetal, Dixon & Morgan, 2015).

Summary

The concept of "scholarship" is important across all higher education institutions. Defining and developing high quality in scholarship are important in delivering all four of Boyer (1996) domains. The purpose of this reflective essay was to review the Quality Matters Program peer review process and identify indicators of quality in scholarship of discovery and teaching. This discussion would suggest that the Quality Matters process would support Boyer (1996) scholarship of discovery and scholarship of teaching overlap where one contributes knowledge, but also to outcomes, process, and passion for the effort. All forms of scholarship are likely to include academic study and achievement at a high level by someone who is a specialist in a particular area and is using a systematic method and discipline, with a reflective approach to practice. The Quality Matters Program could reflect creative scholarship and contribute to the

mission of research. Our discussion should continue and attract higher education administrators and faculty to discover how the integration of scholarship and teaching is generated through infusing research and creative activities within the broader context of Boyer.

References

Allen, I. E., & Seaman, J. (2010). Class Differences: Online Education in the United States, 2010. Sloan Consortium (NJ1)

Bailey, J. L., & Monroe, E. E. (2013). Boyer, Schulman, and Glassick at Brigham Young University-Hawaii, 2012. *International Journal for the Scholarship of Teaching & Learning*, *7*(1), 1-9.

Boyer, E. L. (1996). From scholarship reconsidered to scholarship assessed. Quest, 48(2), 129-139.

Boyer, E. (1990) Scholarship Reconsidered: Priorities of the Professoriate. Princeton, N.J.: The Carnegie Foundation for the Advancement of Teaching

Budden, C. B., & Budden, M. C. (2013). A look at an implementation of the quality matters program in a collegiate environment: Benefits and challenges. *Contemporary Issues in Education Research (Online)*, *6*(4), 381

Glassick, C. E. (2000). Boyer's expanded definitions of scholarship, the standards for assessing scholarship, and the elusiveness of the scholarship of teaching. *Academic Medicine,* 75(9), 877-880.

Hofmeyer, A., Newton, M., & Scott, C. (2007). Valuing the scholarship of integration and the scholarship of application in the academy for health sciences scholars: recommended methods. *Health Research Policy and Systems*, *5*(1), 1

Kern, B., Mettetal, G., Dixon, M. D., & Morgan, R. K. (2015). The Role of SoTL in the Academy: Upon the 25th Anniversary of Boyer's Scholarship Reconsidered. *Journal of the Scholarship of Teaching & Learning*, *15*(3), 1-14. doi:10.14434/josotl.v15i3.13623

Klecka, C. L. (2009). *Visions for teacher educators: perspectives on the Association of Teacher Educators' standards.* Rowman & Littlefield Education. p. 80. ISBN 978-1-60709-128-8.

Legon, R., & Runyon, J. (2007, August). Research on the impact of the quality matters course review process. In *23rd Annual Conference on Distance Teaching & Learning* (pp. 8-10).

Ochoa, A. (2012). The Scholarship of Teaching: Yesterday, Today, & Tomorrow. *Journal of the Professoriate*, *6*(1), 100-116.

Quality Matters Program. (2016a). Welcome: What is the QM Program? Retrieved from https://www.qualitymatters.org/welcome

Quality Matters Program. (2016b). Course Reviews. Retrieved from https://www.qualitymatters.org/reviews

Quality Matters Program. (2016c). Preparing for a Quality Matters Course Reviews. Retrieved   from https://www.qualitymatters.org/reviews/preparing

Rouse, M. (2011, July) Quality Assurance of Pharmacy Curricula International Forum for Quality Assurance, Education and Project Lead for Quality Assurance, retrieved on 5/16/2016 from http://www.monash.edu/__data/assets/pdf_file/0006/178368/rouse-01.pdf

Shattuck, K., Zimmerman, W.A., & Adair, D. (2014). Continuous improvement of the QM rubric and review processes: Scholarship of Integration and Application. Internet Learning, 3(1), 25-34.

Shelton, K. & Saltsman, G. (2005). *An administrator's guide to online education. Information Age*. ISN 1593114249.

Shulman, L. (2000). From Minsk to Pinsk: Why a scholarship of teaching and learning? The Journal of the Scholarship of Teaching and Learning, 1(1), 48-53.

Smith, S. B., Hollerbach, A., Donato, A. S., Edlund, B. J., Atz, T., & Kelechi, T. J. (2016). Streamlining Appointment, Promotion, and Tenure Procedures to Promote Early-Career Faculty Success. *Journal of Professional Nursing*.

Stewart, T. & Webster, N. (2010). *Problematizing Service-Learning: Critical Reflections for Development and Action.* Information Age Publishing. p. 327. ISBN 978-1-61735-210-2.

Starr-Glass, D. (2011). Reconsidering Boyer's Reconsideration: Paradigms, Sharing, and Engagement. *International Journal for the Scholarship of Teaching & Learning*, 5(2), 1-9.

About the authors

Bennie Prince, PhD is Assistant Professor and Health Human Performance Program Coordinator, University of Arkansas at Little Rock, Arkansas.

Her research interests include: teacher education, online education, obesity prevention, K-12 health & physical education curriculum, health education curriculum, assessment of learning, higher education leadership, high impact learning

eMail: Bfprince@ualr.edu

Janea Snyder, PhD, CHES is Assistant Professor, Health and Human Performance Programs, University of Arkansas at Little Rock, Arkansas

Her research interests include: health disparities, heart disease, online education, service learning, comprehensive sex education, obesity prevention, and community health.

eMail: jlsnyder@ualr.edu

Dr. Amar Kanekar PhD, MPH, MB, BS, MCHES, CPH is Assistant Professor and Graduate Coordinator for Health Education at the University of Arkansas in Little Rock, Arkansas.

His research interests include: adolescent health, epidemiology, global health, behavioral interventions and online learning

eMail: axkanekar@ualr.edu

Lipscomb, S.R Sharonda Lipscomb, Med is Instructional Designer and Professional Development Coordinator in the department of Scholarly Technology and Resources, University of Arkansas, Little Rock .

Her research interest include: Online learning, educational technology, student engagement, collaborative learning, learner motivation, student success, mobile learning, and adult education.

eMail: srlipscomb@ualr.edu

Editor's Note: Higher levels of learning present a challenge in changing from and industrial society to an information age society. Critical thinking and its cluster of related skills can only be measured by how well its processes and products satisfy criteria – analyze and synthesize, solve problems, research, organize data, propose and test hypotheses, construct models, conduct experiments, diagnose and prescribe, find or create solutions, make decisions and judgements, and evaluate outcomes. Critical thinking is in the highest level of Benjamin Bloom's Taxonomy of Educational Objectives, Cognitive Domain. It is a critical skill for job seekers in the 21st century.

Effective Critical Thinking Technology Pedagogy

Brent Muirhead, John DeNigris III, Jean R. Perlman
USA

Abstract

The focus of this article is an overview of issues and recommendations to effectively teach critical thinking across emerging technology platforms. This information may be useful to course-developers in understanding how to develop critical thinking pedagogies for 21st Century education. In turn, adult learners may benefit from being prepared for developing skills and abilities to more effectively problem solve 21st Century industry challenges.

Keywords: critical thinking, online learning, technology, distance education, mobile learning, adult learners, problem solving, emergent technology platforms

Introduction

The focus of this article is a discussion of issues involved with teaching critical thinking. The article begins with an overview of teaching critical thinking challenges, including a discussion of distance teaching frames. Next, 21st century approaches to teaching critical thinking is given. The article concludes with a summary of key distance learning recommendations for facilitating critical thinking concepts in an online class.

Challenges of teaching critical thinking

Educators want their students to cultivate reflective thinking skills that provide valuable resources during their academic journey and beyond. It equips them to be prepared for the challenges in their personal and professional lives. Those who are effective critical thinkers are able to navigate through life in a way that improves their problem solving abilities, enhances their decision making skills and enables them to be effective team members and leaders in their chosen profession. Yet, teachers who want to improve student thinking skills are reminded by Miller (2014) that "Transforming thought is one of the hardest things we do as instructors (p. 118)." Why is critical thinking a difficult subject for educators?

Researchers have discovered that there are a variety of factors that can impact those trying to integrate reflective thinking into their online classes. Bullen's research (1998) highlights how the student's reflective skills impact their online discussion contributions due to four factors: cognitive maturity, teaching style of instructor, student's prior learning experiences and degree of understanding of the critical thinking process. The factors indicate that student readiness for learning higher order thinking skills represents a major academic challenge. If students have had only limited opportunities to practice (e.g. identify key elements of an argument), it impacts their current course work because they are missing information cues to trigger their use of critical thinking skills (Halpern, 2014). Therefore, those who strive to teach reflective thinking must understand that "The problem isn't just that students are unskilled at critical thinking---they often don't know when to do it in the first place (Miller, 2014, p. 132)."

Framing critical thinking

According to Fahim & Masouleh (2012) those who explore the nature of critical thinking often reflect the influence of three academic disciplines: philosophy (e.g. Socrates' questions on logical arguments), cognitive psychology (e.g. thinking skills) and education (e.g. Bloom's taxonomy). There are a variety of descriptions about critical thinking and similarities among writers who use terms such as judgment, reasoning, problem solving and questioning.

A major challenge has been how to organize the diversity of critical thinking ideas and concepts. Lai (2011) offers a relevant critical thinking paradigm with three distinct areas: abilities, dispositions and background knowledge.

1. **Abilities**: examine arguments, use inductive and deductive reasoning and problem-solving skills.

2. **Dispositions**: confident, flexible, determined, open-minded, relies on reason and intuition, discerning, curious, creative, seeks knowledge, considers different perspectives, has intellectual integrity and concern for equity.

3. **Background knowledge**: good working knowledge of subject area, evaluate ideas/problems using appropriate criteria, able to explain and apply knowledge.

The categories provide a picture of the essential elements for being a critical thinker who possesses cognitive abilities, a creative disposition and knowledge expertise. It is difficult to capture the richness of these concepts in one definition, which helps explain why there have been numerous attempts. Halpern (2014) shares a practical description of good thinking, "Critical thinking is the use of cognitive skills or strategies that increases the probability of a desirable outcome (p. 8)." This acknowledges reflective thinking is a purposeful activity with outcomes influenced by what people consider to be positive results. Therefore, personal values and beliefs play a role in evaluating outcomes.

In contrast to this definition, Lipman (1995) states "….critical thinking is skillful, responsible thinking that facilitates good judgment because it (1) relies upon criteria, (2) is self-correcting, and (3) is sensitive to context (p. 146)." Critical thinking is described as having standards (criteria to measure achievement), skills (especially cognitive) and personal judgment (making wise choices). The two definitions provide insights into the nature of critical thinking and highlight the complexity associated with the term.

Implications for distance educators

Teachers must develop realistic expectations for promoting critical thinking in their online classes. Students are developing their reflective skills and subject knowledge through an assortment of formal and informal learning activities (e.g. social media). It is wise not to underestimate the challenges and difficulties in teaching reflective thinking and developing a plan that integrates activities throughout the online course. The key to promoting critical thinking skills is to provide numerous learning opportunities for student to practice their skills. Sharing practical and engaging case studies has been a popular instructional technique among distance educators. Miller (2014) relates "Less formal than problem-based learning, case study assignments present students with a compelling, realistic narrative, coupled with prompts asking for conclusions, interpretations, or possible solutions (p. 140)."

Distant educators must identify the specific skills they want their students to learn during their courses. For instance, if they are focused on helping students identify the structure of an argument, they can have their students use Rationale software (http://rationale.austhink.com) which enables students to use graphic tools to map their arguments. If the teacher wants to

enhance their critical reading skills there are software programs such as HyLighter or Microsoft Word enable individuals to share their annotated comments and subject tags with their colleagues (Miller, 2014).

Another effective teaching approach is to use thinking frames that provide a way to use existing structures to guide learning and acquire new knowledge and skills. Examples of thinking frames would be the scientific method and epistemological beliefs (e.g. individual perspectives on knowledge). Teachers provide direct instruction on the foundation principles of the particular thinking frame and share illustrations. As students acquire a basic understanding of the thinking frame, they are given activities to practice using the frame in different contexts. This teaching approach helps students move through three learning stages: acquiring knowledge, becoming able to automatically use the frame and transfer the frame to other subject domains (Bruning, Schraw & Norby, 2010).

Contemporary writers have had a tendency to stress the logical aspects of reflective thought and have neglected emotions (Muirhead, 2014). Research studies focused on academic emotions such as being anxious about tests and grades have found that negative emotions can undermine the ability to apply the most effective learning strategies and hinders the use of sophisticated thinking skills (e.g. elaboration). Student achievement suffers when negative emotions become dominant and individuals can start to feel hopeless about their school work. Yet, when students have more positive emotions toward their course work and abilities, it can increase their level of achievement. Therefore, emotions do impact the student's being able to effectively implement reflective thinking and problem solving skills that are essential for success in school (Villavicencio, 2011; Hanna, 2013).

It is risky for individuals to ignore their feelings. The critical thinking process has a built-in emotional element and this can bring anxiety and even resistance to implementing potential changes that appear threatening (Muirhead, 2014). When adult learners learn to examine the source of their fears and worries, it helps them to manage new academic challenges in their lives. Educators can share lectures and have online discussions about establishing realistic study goals. An interesting dialog could involve how to navigate the use of decision making principles such as promotion (e.g. taking risks) and prevention (e.g. protecting resources) and how they impact the creation and pursuit of goals (Halvorson, 2010). In fact, it would be useful to explore the role of grades in the education and how an excessive focus on grades can restrict growth and learning. Halvorson (2010) offers this wise advice: "If you focus on growth instead of validation, on making progress, instead of proving yourself, you are less likely to be depressed because you won't see setbacks and failures as reflecting your own self-worth. And you are less likely to stay depressed, because feeling bad makes you want to work harder and keep striving (p. 74)."

Researchers continue to explore the best ways that teachers can enhance the acquisition, persistence and transfer of critical thinking skills. People learn within in social context and there are issues involving how to promote and sustain reflective thinking cultures in families, local communities and organizations. It is encouraging that teachers have a diversity of strategies and activities to improve higher order thinking skills (Perkins & Ritchhart, 2004)

Critical thinking epistemology: practical applications

Application of critical thinking to distance learning could be thought of as *critical thinking in action* - a practical interaction among the student, coursework, faculty and online technology. As discussed above, critical thinking in action has two challenges. The first challenge is from the student's perspective: understanding when to engage in critical thinking. Students who have not had education or experience in critical thinking may be confused about what critical thinking means. As a consequence, a student may not see the connection between course work and

applying critical thinking steps. In addition, this confusion may impact the student's ability to effectively use online technology.

Connected to this issue, is the second challenge: faculty's realistic expectations of student engagement in critical thinking (Smith & Stitts, 2013). Faculty may not be able to immediately assess a student's critical thinking knowledge. Consequently, the faculty may inadvertently misinterpret a student's online class performance. The disconnect between student critical thinking understanding and faculty awareness of the student's critical thinking capabilities may generate student dis-interest and decrease involvement in class activities. In turn, students may miss key information to be successful in a class.

Successful distance-learning critical-thinking skill set - adaptation to the environment

Adaptation to the learning environment may be central to successfully meeting the challenges of student understanding of how and when to apply critical thinking, and, of achieving realistic faculty expectations of student critical thinking engagement. For the distance learning environment, implementation of an action learning approach may offer an effective solution. Action learning refers to a pedagogical approach where students learn and interact via scenario analyses (Bradfield, Cairns & Wright, 2015).

An action learning approach encourages students to discuss causes and effects. In effect, a student transitions into critical thinking by engaging in team analysis of outcomes of actions. This approach helps to ensure students have a grounded understanding of critical thinking (Smith & Clark, 2010). From the faculty perspective, the use of action learning enables insertion of guiding comments, and questions. Through active faculty engagement and involvement, students are encouraged to apply critical thinking concepts (Smith & Stitts, 2013).

Practical applications of critical thinking and distance learning for graduate students

As discussed earlier, an approach for distance learning faculty may be to first communicate an application definition of critical thinking for students. Then, second, to engage students in active learning (Smith & Clark, 2010). An additional technique may be more effective for graduate level distance students. In general, graduate students conclude their programs with a thesis or dissertation. Therefore, their focus is on completing this goal. Accordingly, engaging students in a critical thinking path on how they can achieve their personal academic program end goal would facilitate greater student classroom interest and engagement. An additional benefit is the expansion of adult student learning into critical thinking applications in other real-world areas, such as ethical decision making in their work place (Soffe, Marquardt, & Hale, 2011).

Another effective teaching approach is to use thinking frames that provide a way to use existing structures to guide learning and acquire new knowledge and skills. Examples of thinking frames would be the scientific method and epistemological beliefs (e.g. individual perspectives on knowledge). Teachers provide direct instruction on understanding scientific thinking and insights on how people acquire and process information. Then, students can be given learning opportunities to explore creative ways to apply thinking frames in problem solving activities such as case studies.

Critical thinking deliberation

Critical thinking and its applications can be reliant on an individual's orientation toward the types of logic in use and their desired applications (Bochenski, 1961). Flawed reasoning can be within

the domain of logic as it applies to assumptions, analysis, evaluation and the synthesis of reasoned outcomes. Desired outcome, might therefore, influence critical thought, acting as a filter to decision making (Bochenski, 1961) and a context to frame a decision process. Given that critical thought involves different models of reasoning, it follows that one should address the categories of logic and reasoning to better determine how critical though can be articulated and framed.

Deductive reasoning follows an algorithm often referred to as a syllogism. Syllogisms have their origin in Greek philosophy and mathematics and follow the form: premise, qualifier and conclusion (Bochenski, 1961). Deductive logic cascades assumptions and relates logical outcomes to an assumption that a premise is true based on verbal symmetry and sentence syntax. Deductive reasoning is deterministic, moving from a generalized idea to a specific idea, and assures an outcome or a guaranteed conclusion.

Alternatively, inductive reasoning has its origin in the idea that a conclusion can be false even though the premise might be true (Copi, Cohen & Flage, 2007). Inductive reasoning inverts deduction certainty that is based on a stated premise and suggests that a generalized uncertain outcome or conclusion might be false even if its premise is true.

Further complexity of learning critical thought germinates if adductive reasoning is considered. Abductive reasoning's origins come from the work of Charles Sanders Peirce (Crease, 2009). It suggests that sometimes critical thought intersects creative thought and takes the form of making your best guess on the decision in question (Treffinger, Isaksen, & Stead-Dorval, 2006). Delineating the concept and imbedded logic of critical thinking can, given the types of logic employed, provide a possible basis for a complete analysis of an undertaking and the evaluation of goals within the analysis and application being sought, but not without reflection on the logic in use. Abductive reasoning, for example, extends and expands critical thought, but also could be considered flawed reasoning if used in the deductive reasoning domain. Since abductive reasoning affirms consequences (abducts outcomes) it creates *the deductive logical fallacy* of *Post hoc ergo propter hoc* or *affirming the consequence*. Critical thought based on choosing one outcome from many and disregarding the many possible outcomes must be tempered with the context and purpose of the reasoning and might be considered subjective reasoning.

The complex process of critical thinking and logics that shape reason can lead to implications which include how instructors and trainers craft each critical thinking component into a unique thread of thought. If critical thinking is taught as singular components, outcomes might be skewed and misdirected or biased rather than enabling neutrality in employing relevant thinking to a problem, issue or argument. Benson and Moffett (2007) suggests that using one method of critical thought may prove to be insufficient.

Critical thinking might be best learned and demonstrated within the context of the domain of study or problem being addressed. The implications holistic critical thinking postulate might redirect how critical thinking is taught from an isolated discipline to possible active content engagement. Content engagement and critical thought might extend into the domain of integrated reason processes where the whole of the issue is examined within multiple lenses of logic and their content intersects.

Critical thinking delivers value to its user by assuring that a process is employed which has a reasoned and methodological outcome, but reasoning that is monolithic and possibly logically limited or contradictory might be better taught when applied in a setting or context that allows its process to be more organic and germane when making decisions. Organic critical though support the utilization of multiple lenses of logic. Research generated in Harvard's Project Zero founded by Perkins (2009) suggests that thinking involves visualization and engagement. Visualization is managed process of developing tangible representation of an issue from abstract or intangible

ones. Visualization channels critical thought through purposeful engagement that represents immersing the student in the cerebral process and within the context of the questions being asked. Perkins (2009) fashions the terminology of "aboutitus and elementitus" using "itis' itus" as a suffix to word meanings of "about" and "elements" (suggesting that the suffix might imply or mean, as in medical science, the "inflation of" its precedent). His coined and associative terminology places an emphasis on using a visualization approach to learning and reasoning or in part learning by doing i.e. creative exercises, relevant event participation and perhaps, co-facilitation, ethnographic engagement or, action research.

Additional critical thinking opportunities exist in the research of Ritchart, Church and Morrison (2011) of Harvard University. Ritchart's et al. (2011) research enhances the ideas of learning and critical thinking by the structured development a students' "*thinking dispositions".* Ritchart et al. (2011) research advocates suggest that critically understanding a topic can be collaterally influenced by helping students to make "thinking visible." Ritchart et al. (2011) portends that "visible thinking" is composed of six key principles:

- Learning is a consequence of thinking—understanding is a derivative a student thinking within the content the student is studying.

- Good thinking is not only a matter of skills, but also a matter of dispositions—suspension of personal bias, curiosity, creativity and imagination are positive dispositions that shape critical thought.

- The development of thinking is a social endeavor—interaction with others shapes thought.

- Fostering thinking requires making thinking visible—demonstrate what is being thought through speech, writing and iconic representation.

- Classroom culture sets the tone for learning and shapes what is learned—Consistent patterns formed by cohesive groups influences thought.

- Schools must be cultures of thinking for teachers –critical though practices must be shared and practiced (Perkins & Ritchhart, 2004; Perkins, Tishman, Ritchhart, Donis, & Andrade, 2000).

Conclusions and recommendations

Teaching critical thinking continues to be a concern in 21st century adult distance learning education. There is an increasing need for critical thinking to be taught in online education. Industry practitioner leaders have identified a need for educated workers who can critically think on the job. Accordingly, there is active interest in exploring optimal approaches for course designers to develop effective 21st century critical thinking models. Teachers need technology platforms and effective pedagogues to enhance student acquisition, persistence and transfer of critical thinking skills.

Part of the issue is that students don't understand how to do critical thinking. A first step in addressing this issue is to frame critical thinking. The foundation of this frame, is defining a problem, and development of potential resolutions. The challenge for distance learning faculty is to teach problem definition and resolution in an asynchronous environment. Students need a way to assess their ability to problem solve in a critical thinking way.

In sum, the applications for teaching critical thinking is emerging as a key skill in the 21st Century. Critical thought has its historic and contemporary origins grounded in multiple disciplines and emerging research, but its applications are linked to logic and tangible outcomes of the sometimes divergent logics employed. Teaching others how to critical think might

therefore, require deliberated reflection and conscious recognition about the agendas being advanced before choosing the logical paths to employ in a critical thinking process.

References

Bradfield, R., Cairns, G. & Wright, G. (2015). Teaching scenario analysis - an action learning pedagogy. Technological Forecasting and Social Change, 100, 44. doi:10.1016/j.techfore.2015.05.005

Bension, J, Moffett, M.A. (2007). Know-How and Concept Possession. Philosophical Studies 136 (1). 31-58.

Bochenski, I.M., (1961) A History of Formal Logic, Indiana, Notre Dame University Press.

Bruning, R. H., Schraw, G. J. & Norby. M. M. (2010). Cognitive psychology and instruction, 5th Ed. New York: Pearson.

Bullen, M. (1998). Participation and critical thinking in online university distance education. Journal of Distance Education. 13 (2), 1-32.

Copi, I. M. Cohen, C. Flage, D. E. (2007). Essentials of Logic (2nd ed.). Upper Saddle River, NJ: Pearson Education.

Crease, R. P. (2009). Covariant Realism. Human Affairs 19, 222-232.

Fahim, M. & Masouleh, N. S. (2012). Critical thinking in higher education: A pedagogical look. Theory and Practice in Language Studies, 2(7), 1370-1375.

Halpern, D. F. (2014). Thought and knowledge: An introduction to critical thinking, 5th ed. New York City, NY: Psychology Press.

Halvorson, H. G. (2010). Succeed: How we can reach our goals. New York: Hudson Street Press.

Hanna, E. P. (2013). A cognitive emotional methodology for critical thinking. Advances in Applied Sociology, 3(1), 20-25. http://dx.doi.org/10.4236/aasoci.2013.31003

Lai, E.R. (2011). Critical thinking: A literature review. Pearson research report. Available: http://www.pearsonassessments.com/hai/images/tmrs/criticalthinkingreviewfinal.pdf

Lipman, M. (1995). Critical thinking - what can it be? In A. L. Ornstein & L. S. Behar (Eds.) Contemporary Issues in Curriculum, Boston, MA: Allyn & Bacon.

Miller, M. D. (2014). Minds online: Teaching effectively with technology. Cambridge, MA: Harvard University Press.

Muirhead, B. (2014). Beyond Wisdom: Ideas That Matter. Digital Impact Design, Cornelia, GA.

Perkins, D., (2009) Making learning whole: How seven principles of teaching can transform education. San Francisco, CA: Jossey-Bass.

Perkins, D. N., & Ritchhart, R. (2004). When is good thinking? In D. Y. Dai & R. J. Sternberg (Eds.), Motivation, emotion, and cognition: Integrative perspectives on intellectual functioning and development (pp. 352–383). Mahwah, NJ: Erlbaum.

Perkins, D. N., Tishman, S., Ritchhart, R., Donis, K., & Andrade, A. (2000). Intelligence in the wild: A dispositional view of intellectual traits. Educational Psychology Review, 12(3), 269–292.

Ritchart, R., Church, M., & Morrison, K. (2011). Making thinking visible: How to promote engagement, understanding and independence for all learners. San Francisco: Jossey-Bass.

Ritchhart, R. & Perkins, D. N. (2005). Learning to think: The challenges of teaching thinking. In Holyoak, K. J. & Morrison, R. G. (Eds.). The Cambridge Handbook of Thinking and Reasoning, 775-802.

Smith, J. W., & Stitts, D. K. (2013). Using action learning and critical thinking tools to make changes in higher education. Contemporary Issues in Education Research (Online), 6(1), 73-n/a. Retrieved from http://search.proquest.com/docview/1418450470?accountid=458

Smith, J.W. and Clark, G. (2010). Action Research in a Business Classroom Another Lens to Examine Learning. American Journal of Business Education, 3(7), 41-56.

Soffe, S. M., Marquardt, M. J., & Hale, E. (2011). Action learning and critical thinking: A synthesis of two models. Action Learning: Research and Practice, 8(3), 211.

Treffinger, D. J., Isaksen, S. G., & Stead-Dorval, K. B. (2006). Creative problem solving: An introduction (4th ed.). Waco, TX: Prufrock Press.

Villavicencio, F. T. (2011). Critical thinking, negative academic emotions and achievement: A mediational analysis. The Asia-Pacific Education Researcher, 20(1), 118-126.

About the authors

Brent Muirhead Ph.D. is an educator and writer with numerous publications in educational technology. He has a BA in social work, master's degrees in religious education, history, administration, e-learning, computing in education/cognitive psychology, adult education and two doctoral degrees in education. His graduate degrees include Columbia University, New York City and University of Georgia. He has received five university teaching and leadership awards. Dr. Muirhead has taught online university classes for over 15 years. He is Senior Online Editor for the *International Journal of Instructional Technology & Distance Learning*. His latest book is *Beyond Wisdom: Ideas That Matter.*   E-mail: drmuirhead@yahoo.com

John DeNigris, MBA, PHD. As a former Sr. Vice President of CBS Records and Video, Dr. DeNigris has over 29 years' experience in finance, management and marketing within Fortune 500 companies and has been conferred with over two dozen nation awards for his contributions to discipline of management, marketing, leadership and corporate online learning and training. Within academia, Dr. DeNigris has held positions of Faculty Trainer, Curriculum Developer, Subject Matter Expert, Dissertation Mentor, DBA Area Chair and the Journal of Leadership Studies Advisory Board member. Dr. DeNigris has been honored with three Faculties of the Year awards from multiple Universities in which he was formally engaged. He has an MBA and a Ph.D. in Management with concentration in Organizational Development and is a member of Delta Mu Delta International Honor Society in Business Administration.   E-mail: denigris@email.phoenix.edu

Jean R. Perlman, MBA, JD, DBA, is a Strategist, Speaker, and Educator with 30+ years' experience delivering action results to executive teams. "Transforming Complicated to Simple", Dr. Perlman specializes in critical thinking for mission targeting and organization productivity. She has worked with small and large companies; where her strategies resulted in 50% increased team productivity, multimillion-dollar milestone achievement, and 100% profit-center launch success; industry leader standing; increased markets and profits over 150%. Dr. Perlman has been a University of Phoenix faculty member since 2002. Her honors include Outstanding Teacher Award; Dissertation Chair, American Juris Prudence Award (Business Counseling); and keynote speaker for chamber of commerce and the US SBA.
Email: jrperlman@bizdirections.com

Crowdsourcing platform 'Ushaurikilimo' enabling questions answering between farmers, extension agents and researchers

Camilius A. Sanga, Joseph Phillipo, Malongo R.S. Mlozi, Ruth Haug, Siza D. Tumbo
Tanzania and Norway

Abstract

Agricultural extension service in Tanzania faces a number of problems including having limited number of staff and limited ability to acquire, solve and synthesize problems and solutions related to agriculture from different actors (i.e. crowd). Recent development in mobile phones provide an effective tool to link different actors in various agricultural value chains using crowdsourcing platforms. In this study, a framework for an agro-advisory service system (crowdsourcing platform called 'Ushaurikilimo') is proposed. The proposed framework uses farmers who have the ability to report any problem they are facing in field using either web or mobile phones. The submitted query can be answered by extension agents and if it is a difficult problem, a researcher can answer after re-assignment. This process is called spatial crowdsourcing. The framework has been piloted in Kilosa District for more than 3 year and preliminary results show promising outcomes. We have more than 1000 answered questions from more than 700 farmers.

Keywords: crowdsourcing, ushaurikilimo, farmers, extension agents, researchers, mobile phones, web

Background information

When Howe (2006) introduced the concept of crowdsourcing, there emerged some confusion and debate among researchers on three terms:. crowdsourcing itself, customer made content, and user-generated content. (Brabham, 2008) came up with a clear definition that states that

> "Crowdsourcing is an online, distributed problem-solving and production model".

The site, trendwatching.com, (2006) states clearly the definition of customer-made as

> "The phenomenon of corporations creating goods, services and experiences in close cooperation with experienced and creative consumers, tapping into their intellectual capital, and in exchange giving them a direct say in (and rewarding them for) what actually gets produced, manufactured, developed, designed, serviced, or processed."

User-generated content was defined by Krumm, Davies and Narayanaswami (2008) as

> "User-generated content comes from regular people who voluntarily contribute data, information, or media that then appears before others in a useful or entertaining way, usually on the Web".

Distinction of these terminologies can help us get a clear picture of what is crowdsourcing. Furthermore, the review done by Estellés-Arolas and González-Ladrón-de-Guevara (2012) came to draw a conclusion that

> "Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and

modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage that what the user has brought to the venture, whose form will depend on the type of activity undertaken".

From these definitions, crowdsourcing is basically enabled by the use of Information and Communication Technologies (ICT) to harness the science, technology, skills and efforts from a crowd of people. Thus, crowdsourcing is a process of obtaining service by requesting either paid or volunteer individual to contribute online. The contribution is done by online community rather than the preferred official service provider.

Pawar *et al*. (2015) points out some advantages of crowdsourcing which include receiving better quality results contributed from a large number of people who can offer their best ideas, experience and solutions.

Application of crowdsourcing in different areas

Before we look at some areas in which crowdsourcing is mostly used, let us see its main tools or enablers. Crowdsourcing has found its way in the modern, information enabled, world via the World Wide Web (Ramakrishnan & Halevy, 2011) as well as Mobile phones (Chatzimilioudis, Konstantinidis, Laoudias, & Zeinalipour-yazti, 2012). (Alt *et al*., 2010) gives different examples in which mobile phones have been used in crowdsourcing ("askus", "fashism" and "Ushahidi") that was developed and used in Kenya. Also other examples are MFarm, a mobile and web-based market information system and iCow, a mobile cow gestation calendar and information service which have been implemented in Kenya (USAID, 2013).

Poetz and Schreier (2012) assessed the value of crowdsourcing in the perspective of competing between users and professionals in providing new product ideas. They found out that user ideas had significant higher score in terms of novelty and customer benefit, but somewhat lower in terms of feasibility. Hence, they concluded by suggesting that "at least, under certain conditions, crowdsourcing might constitute a promising method to gather user ideas that can complement those of a firm's professionals at the idea generation stage in New Product Development (NPD)". This means that, crowdsourcing can facilitate business operations and products.

Crowdsourcing application for agricultural development has been presented in the briefing paper by the USAID (USAID, 2013) stating different agricultural areas in Africa that has benefited from crowdsourcing. These include tracking pest and disease outbreaks, for example, the Centre for Agricultural Bio-science Information (CABI) has proved to be successful in many of the African countries including Uganda, Kenya, Congo etc. Another area is the verification of local weather information, and collective buying and selling agricultural crops. (Pawar *et al*., 2015) also studied the application of crowdsourcing in agriculture using the case of India. They developed a web based platform for India farmers as well as agricultural institutes and agro-based industries to share farming methods and practices.

Table 1
Agricultural Information Dissemination models (Adapted from Zhang et al., 2016)

	Information service model	Operational features	advantages	limitations
Model 1	Web Portal	A collection of relevant web sites to form a one stop portal for users.	Easy access, compressive and in-depth information provision.	One for all information, No customization. May not be relevant to an individual user's specific information need.
Model 2	Voice-Based Service	Information dissemination through phones or online voice calls.	Interactive communications, easy to understand and individual service.	Require human involvement, time consuming and less efficient, more costly.
Model 3	Text (SMS)-Based Service	Disseminating information via Mobile phone texts.	Push-based approach, very effective and efficient in sending short and timely messages.	Cannot provide comprehensive and in depth information. One for all service. May not be relevant to individual user's specific information needs.
Model 4	Online Community	A membership system involving all stakeholders, share experience and exchange information through interactive service platforms.	Interactive communications, relevant information, user participation, cost effective service.	Require active user participation, efforts and good management. Service is only available for members.
Model 5	Interactive Video Conferencing Service	Information dissemination using online conferencing service.	Easy to understand, very effective communications, interactive service.	Require human involvement can be time consuming and less efficient, costs is high due to the involvement of human experts.
Model 6	Mobile Internet Based Service	Information dissemination using Mobile Internet service via smart phones.	Ubiquitous, cost effective, easy access, can incorporate GPS technology to provide location related service.	Require adequate infrastructure and the use of smart device. Require higher IT skills to use new technologies.
Model 7	Unified Multi-Channel Service Model	Using multiple models to effectively disseminate information through telephones, computers, and mobile phones.	Flexible service combining advantages of all models.	Require Investment in ICT infrastructure and equipment, require more effort and support from key stakeholders.

Marketing activities have also benefited from crowdsourcing. This is demonstrated by (Gatautis & Vitkauskaite, 2014) who saw a bunch of opportunities in marketing areas such as marketing research, communication, new product development and testing, distribution management, content marketing and innovative ideas development. However, they warned of some ethical issues and other possible limitations analyzed different factors affecting consumer involvement in crowdsourcing deployment in company's marketing activities.

Furthermore, (Alt *et al*., 2010) devised a location-based crowdsourcing with the intention of going to real world. They discovered that "(a) mobile workers prefer to pull tasks rather than getting them pulled, (b) requests for pictures were the most favored tasks, and (c) users tended to solve tasks mainly in close proximity to their homes." These results were obtained following the development of a prototype for location-based mobile crowdsourcing consisting of a web and mobile clients. Via these clients, "crowd" can search for tasks and submit solutions that link to a real world.

Nevertheless, another important application of crowdsourcing have been in the field of disaster management as quantified by (Goodchild, & Glennon, 2010). The fact that disaster management "…agencies have limited staff, and limited ability to acquire and synthesize the geographic information that is vital for effective response" and considering the fact that "…an average citizen is equipped with powers of observation and is now empowered with the ability to geo-register

those observations, to transmit them through the Internet, and to synthesize them into readily understood maps and status reports". However, the concerns of the authors were on the aspects of data quality of the respondents, formalization of rules which authorize contributed geographic information to be evaluated against its geographic context, and the prototyping of software tools that would implement these rules.

These application areas in different angles of life especially for developing countries have a very big implication in improving the livelihood. Agriculture, being the backbone of the African economy, needs a sophisticated approach with the use of ICT as an enabler. van Etten (2011) proposed a crowdsourcing seed – based innovation to solve the problem of distributions of seed in Sub-Sahara Africa. Even though crowdsourcing seed – based innovation is a noble idea – the idea has not been implemented in any country.

Implementation challenges of crowdsourcing

Gathering information from a crowd of people is a challenging thing as observed by (Ramakrishnan & Halevy, 2011), who states four key challenges which are "how to recruit contributors, what they can do, how to combine their contributions, and how to manage abuse". Also crowdsourcing systems providers need to balance between openness and quality.

The briefing paper by the USAID (USAID, 2013) analyzes challenges like human resources in ensuring skilled expertise, data quality in terms of noise, monitoring and evaluation, to mention a few. Other challenges mentioned by researchers are privacy issues, specifying priorities (Alt, Shirazi, Schmidt, Kramer, & Nawaz, 2010).

This means that, getting a "work done" using a crowd of people poses a number of issues that need to be looked at and handled with care.

Therefore, based on literature reviewed, it's our hope that crowdsourcing in agriculture will be success story in Sub-Sahara Africa and Tanzania, in particular (van Etten, 2011). This article presents a framework for a crowdsourcing platform that links between farmers, and links extension agents and farmers.

Description of the case study

M-FAIS and W-FAIS have been developed through EPINAV fund. The systems are available at http://ushaurikilimo.org/index.php. The integration of M-FAIS and W-FAIS is what is termed 'Ushaurikilimo' in Swahili. 'Ushaurikilimo' is a Swahili word that stands for 'Agro-Advisory'. The development of agro-advisory system has been done participatory with farmers and other actors for almost 3 years now. Any agricultural actors (farmers, etc.) can send a question via mobile phone to a local phone number (+255) - 688099408. Also, there is a backup international number in case the system is not accessible through the local phone number. After the question has been posted in the system, extension officers in Kilosa can answer via their mobile phones. Also, farmers can send question using our system directly (http://ushaurikilimo.org/farmerloginok.php?fname=1). This is for those who have access of Internet. Questions that are answered are pushed back to the farmer's mobile phone and a copy of the answer is posted on W-FAIS. Examples of answered questions are: http://ushaurikilimo.org/maswalimajibu.php. Furthermore, we created a facebook page for agricultural actors who might be interested to follow what is happening in our project: https://www.facebook.com/Ict4AgriculturalExtensionServices. Currently we are developing a mobile app so that some stakeholders in different agricultural value chains who have smartphones can access and use the crowdsourcing platform (http://www.getmynumber.co.uk/kilimo.apk).

Framework for crowdsourcing platform called 'Ushaurikilimo'

The proposed national framework for e-extension consists of three building blocks (Figure 1). The implementation of the proposed framework will be the responsibility for all Agriculture Sector Leading Ministries (ASLMs i.e. Ministry of Agriculture, Livestock and Fisheries & Ministry of Education, Science, Technology and Vocational Training) at national level, while the President's Office of Regional Administration and Local Government, Public Service and Good Governance will oversee the implementation at local Government level.

On the left hand side there are six building blocks which cater for a mix of conventional agricultural extension service and ICT based agriculture extension service supported by Government.

On the right hand side there are four blocks which cater for public-private-partnership (PPP). This is in form of pluralism agricultural extension service which is offered by various actors in a private sector (multi-actors – e.g. Non-governmental organizations, Donor-supported projects, Private agribusiness organization, community-based organizations (CBOs), farmer's groups, associations, cooperatives, societies and networks)).

The middle of framework consists of parastatals offering different services linked to farmers like Tanzania Meteorological Agency, National Bureau of Statistics (NBS) etc. All these different building blocks of the proposed framework can be linked together using 'Ushaurikilimo'.

'Ushaurikilimo.org' is an Agro-Advisory Service that allows any agriculture actors (e.g. farmer, extension officer, policy maker, trader, etc.) to request advice from an agriculture extension officer using either web or mobile phone. This means the system consists of web and mobile sub-systems. Thus, Ushaurikilimo is an integrated system which has modules for mobile based farmers' advisory information system (M-FAIS) and web based farmers' advisory information system (W-FAIS). M-FAIS & W-FAIS allow farmers to get advice on various agricultural issues such as agronomic practices, post-harvest operations, livestock husbandry, forestry, veterinary services, community development and market. A farmer can send a question to either +255688099408. After that the farmer or any actor is answered by agriculture experts via his or her mobile phone.

If the question is simple, the extension officer who is at the village can answer it. But if the question asked by a farmer is difficult, then the system can forward it to the ward extension officer. In case, if the question is too difficult for the ward extension officer, it can be forwarded to the district extension officer who is supposed to be subject matter specialist (sms). Otherwise, if the question is too difficult to be answered by extension officers in village, ward and district, it can be forwarded to experts from Agricultural Research Institutes, Livestock Institutes and Universities for answers or for further research. This process of seeking advisories from different experts is called spatial crowdsourcing (Kazemi & Shahabi, 2012).

Between the village e-extension committee and ward e-extension committee there is an innovation platform or forum learning alliance which deals with discussion of issues that need intervention and take actions or recommendations to higher authorities from queries submitted periodically from 'Ushaurikilimo'. Also, there is a different knowledge loop from districts where agro-zones form a network of zonal radio stations. The task of the zonal radio station is to broadcast issues that are of interest and relevant to certain agro-zones. Furthermore, different zonal radio stations are connected with a National wide broadcasting corporation TV or radio to publicize issues of national interest.

Experts from other organizations offering agricultural extension services to farmers can answer questions from farmers (or other agric-value chain actors). Examples of such organizations are

Non-Governmental Organizations (e.g. MVIWATA), Community based Organizations (CBOs) and Faith based Organizations (FBOs).

In order for this Agro-Advisory system (AAS) to work perfectly it must be supported by good enabling policies formulated to enable collaboration between regional e-extension committees and the national steering e-extension steering committee, which must be under President's Office of Regional Administration and Local Government, Public Service and Good Governance. The President's Office of Regional Administration and Local Government, Public Service and Good Governance must partner with other line ministries (Ministry of Food security, Cooperatives and Agriculture (MAFC); ministry of ICT, science and education) in implementing a blended agricultural extension service. Also, the PMOLGA can be supported by a consortium of e-extension which consists of (donors, regional organization, and international organization).

National framework for implementation of agro-advisory system 'Ushaurikilimo'
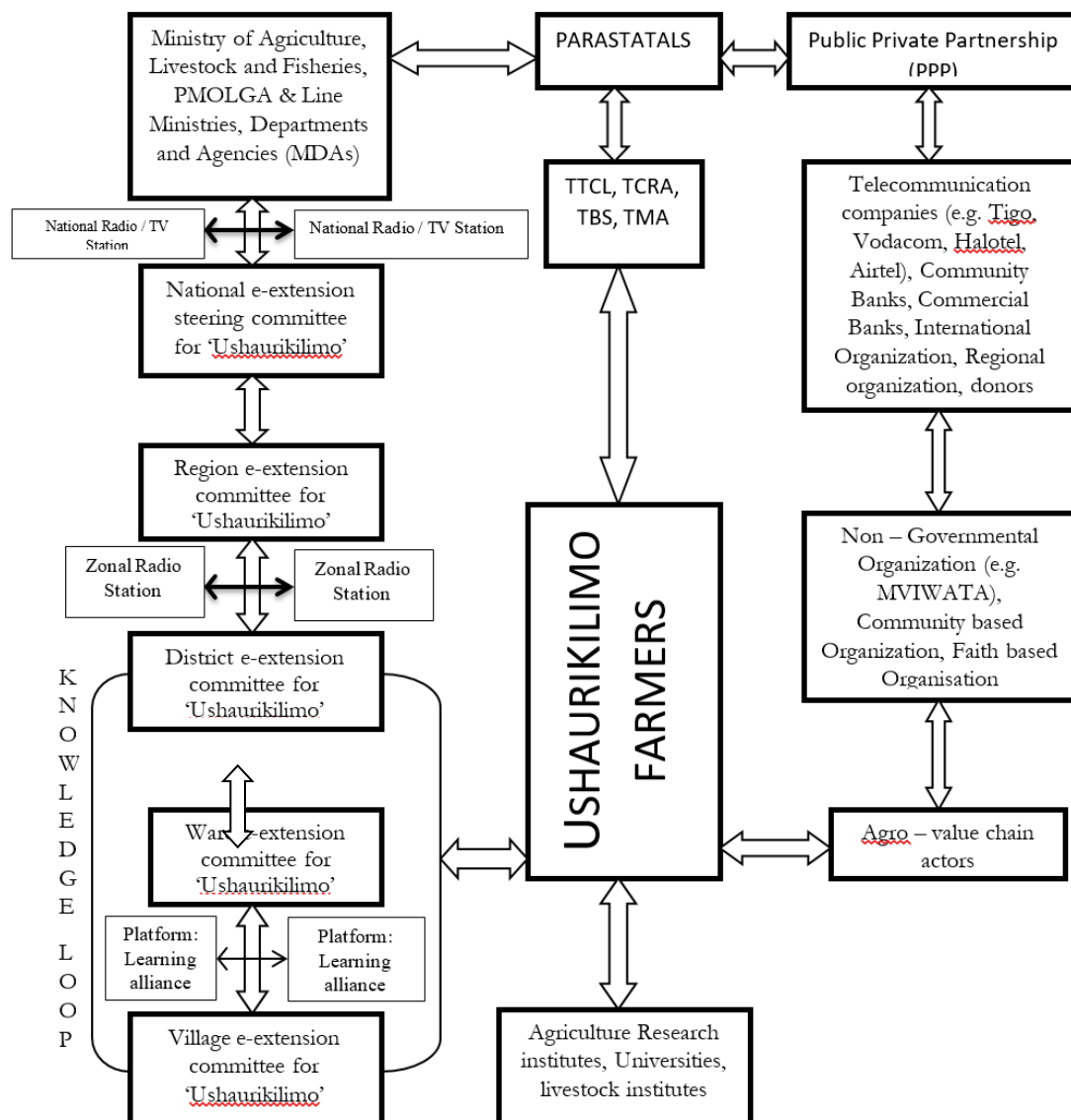
Figure 1 Proposed national framework for implementation of Sua Agro-advisory system 'Ushaurikilimo'

Most of the activities of Ushaurikilimo related to mobile phone information literacy and user training can also be done by private telecentre, call centre, ICT incubation centre as well as in ward agricultural resource centre.

Results
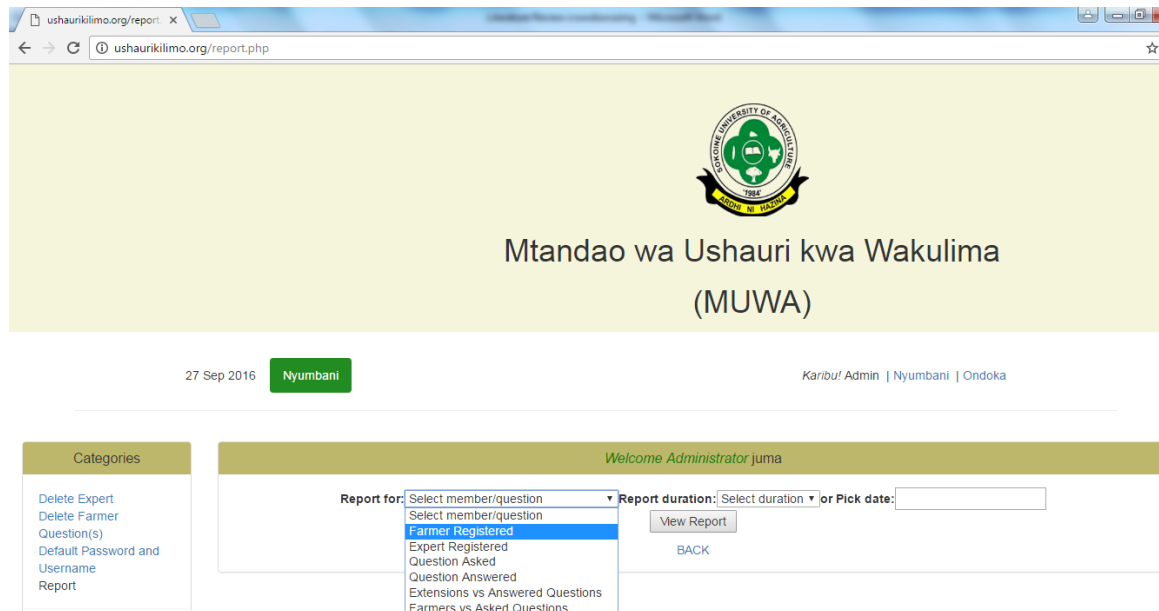
Figure 1: Interface for downloading different types of reports from Ushaurikilimo

Ushaurikilimo has

- 705 registered farmers from 19 villages of Kilosa District and some other districts in regions of Tanzania.

- 27 registered experts (i.e. agricultural extension officers).

- 1187 answered questions

- 1739 asked questions

Ushaurikilimo has an embedded module for decision support system (Figure 2). It guides the system analyst in reporting some weekly, monthly and yearly reports. For example the following are some of the report from piloted study which has been done in more than 2 years:

- The average response time for a farmer to get an answer from an extension agents is 35.07 hours

- The average Number of Questions per extension agent is 41.5 questions where 1162 questions were answered

- 33 questions were asked by the first farmer to ask question while the least number was 1. The average Number of Questions per farmer is 2.35 questions where 1624 questions were asked

From the above results prove that the implementation of a crowdsourcing platform 'Ushaurikilimo' has brought the following advantages, namely: (a) improved costs of having extension agents in a District, (b) the service delivery has becomes faster, (c) quality of service is

better, (d) there is flexibility of farmer to either send SMS or visit extension agents for service. On the other end, extension agents can send advisories before planning to visit a farmer, (e) the scalability of the service allows extension agents to serve many clients (i.e. farmers), or diversity

Discussion

The preliminary findings from Ushaurikilimo show that this crowdsourcing platform is addressing some of the main problems facing conventional agricultural extension service, namely:

1. Limited access to extension agent by farmers: In Tanzania each extension agent has to assist more than 2500 farm families in his/her area (Ragasa *et al*., 2016).

2. With crowdsourcing platform like Ushaurikilimo the problem of limited extension agents is addressed since one extension agents can service farmers scattered through the country.

3. There is no system to store the knowledge base of extension agents. Currently the best practices of farmers are documented manually by extension agents. This is different from the Ushaurikilimo which deposited in real time the questions asked by farmers and answers provided by extension agents or researchers. The data are under Kilosa Open Data Initiative (KODI). This means that questions and answers can be accessed through open access copyright (http://ushaurikilimo.org/Copyright_Policy_2013_2016.pdf).

4. There are limited tools to collect real time information from the field when taking timely decisions. Usually extension agents collect and prepare a very large amount of data concerning agricultural manually. This is different from Ushaurikilimo which complement the traditional agricultural extension service system by proving tools for collecting data from field using their mobile phones. The data are then analysed for aiding decision making to either extension agents or researchers or policy makers. Also, there is mobile app and social media to support many stakeholders in information, knowledge and innovations sharing.

The enthusiasm of the farmers, extension agents and researchers to participate in crowdsourcing is very high. The evidence for this is that we are receiving questions (i.e. query) from other districts which are not part of the project area. Another factor contributing to this is that currently any user of the system uses it free. There is no cost associated with the service. Furthermore, the system allows the free SMS given when any mobile phone user received after buying pre-paid bundle (airtime). Thus, the farmers, extension agents and researchers who have used the system trust the advisories given from the crowdsourcing platform.

In case of extension agents – we opted to use those who are paid by Government to minimize cost. They are not being paid by the project because the platform allows them to do their day to day activities with minimum efforts. The algorithm for assignment of questions (i.e. weight sum model) allows more than one expert to be given a single problem (Fue *et al*., 2015). The aim is to maximize the possibility of obtaining the most correct answers. This algorithm is different from reward-based and self-incentivised spatial crowdsourcing algorithms (Kazemi, & Shahabi, 2012; Kazemi *et al*., 2013).

The crowdsourcing platform 'Ushaurikilimo' has also been piloted as a tool for

1. disease surveillance in Kilosa (Kipanyula *et al*., 2016)

2. early warning system for rabies (Kipanyula *et al*., 2016)

3. dissemination and communication of radio promo (jingles) to farmers using Kilosa community radio (Sanga *et al*., 2013)

Furthermore, the crowdsourcing 'Ushaurikilimo' has open data which is of benefit to the general public who acts as a sensor in either submitting queries or responding to questions (i.e. human web sensor).

Thus, the success of Ushaurikilimo is attributed to contributions by farmers, motivation of the community, and a high level of participation. [1]Previous literature showed two questions are important before designing a successful mobile development tool (1) Do target users have access to and literacy in using mobile phones? (2) What is the incentive for people 'the crowd,' to participate?

Conclusion

This article presents the definition of crowdsourcing from different perspectives. It is based on a variety of proven crowdsourcing models. It is based on a study of crowdsourcing application areas, and more specifically, the use of crowdsourcing in agriculture. The last section presents a proposed framework for crowdsourcing that is grounded in principles found in different scholarly works previously done in this area. Finally, the results from the implementation of the proposed framework have been presented.

References

Alt, F., Shirazi, A. S., Schmidt, A., Kramer, U., & Nawaz, Z. (2010, October). Location-based crowdsourcing: extending crowdsourcing to the real world. In Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries (pp. 13-22). ACM.

Brabham, D. C. (2008). Crowdsourcing as a model for problem solving an introduction and cases. *Convergence: the international journal of research into new media technologies*, *14*(1), 75-90.

Chatzimilioudis, G., Konstantinidis, A., Laoudias, C., & Zeinalipour-Yazti, D. (2012). Crowdsourcing with smartphones. IEEE Internet Computing, 16(5), 36-44.

Doan, A., Ramakrishnan, R., & Halevy, A. Y. (2011). Crowdsourcing systems on the world-wide web. *Communications of the ACM*, *54*(4), 86-96.

Fue, K. G., Tumbo, S.D., & Sanga, C.A. (2015). Experts' Assignment Algorithm for Cloud- based Agro-advisory Service Information System (CASIS) using Weighted Sum Model: Piloting CASIS. Beyond Connectivity: The Road to NREN Maturity, UbuntuNet-Connect 2015, 19-20 November 2015, Maputo, Mozambique: http://www.ubuntunet.net/uc2015_cfp

Gatautis, R., & Vitkauskaite, E. (2014). Crowdsourcing application in marketing activities. *Procedia - Social and Behavioral Sciences*, *110*, 1243–1250.

Goodchild, M. F., & Glennon, J. A. (2010). Crowdsourcing geographic information for disaster response: a research frontier. *International Journal of Digital Earth*, *3*(3), 231-241.

Howe, J. (2006). The rise of crowdsourcing. *Wired magazine*, *14*(6), 1-4.

Kazemi, L., & Shahabi, C. (2012, November). Geocrowd: enabling query answering with spatial crowdsourcing. In Proceedings of the 20th International Conference on Advances in Geographic Information Systems (pp. 189-198). ACM.

Kazemi, L., Shahabi, C., & Chen, L. (2013, November). Geotrucrowd: trustworthy query answering with spatial crowdsourcing. In *Proceedings of the 21st acm sigspatial international conference on advances in geographic information systems* (pp. 314-323). ACM.

Kipanyula, M. J., Geofrey, A. M., Fue, K. G., Mlozi, M. R., Tumbo, S. D., Haug, R., & Sanga, C. A. (2016). Web and Mobile Phone Based Rabies Surveillance System for Humans and Animals in

---

[1] https://www.engagespark.com/blog/two-questions-ask-before-designing-m4d-project/

Kilosa District, Tanzania. International Journal of Information Communication Technologies and Human Development (IJICTHD), 8(2), 47-59. doi:10.4018/IJICTHD.2016040104

Kipanyula, M. J., Sanga, C. A., Geofrey, A. M., & Fue, K. G. (2016). On Piloting Web-Based Rabies Surveillance System for Humans and Animals: Web-Based Rabies Surveillance System. In T. Iyamu, & A. Tatnall (Eds.) Maximizing Healthcare Delivery and Management through Technology Integration (pp. 305-323). Hershey, PA: Medical Information Science Reference. doi:10.4018/978-1-4666-9446-0.ch017

Pawar, C. V, Patni, S. S., Wale, S. K., & Chemate, H. B. (2015). Exploring Agriculture Sector Using Crowdsourcing Predictors, International Journal for Research in Applied Science and Engineering Technology (IJRASET), 3(4), 711–714.

Poetz, M. K., & Schreier, M. (2012). The value of crowdsourcing: can users really compete with professionals in generating new product ideas?. *Journal of Product Innovation Management*, *29*(2), 245-256.

Ragasa, C., Ulimwengu, J., Randriamamonjy, J., & Badibanga, T. (2016). Factors Affecting Performance of Agricultural Extension: Evidence from Democratic Republic of Congo. *The Journal of Agricultural Education and Extension*, *22*(2), 113-143.

Sanga, C., Kalungwizi, V. J., & Msuya, C. P. (2013). Building an agricultural extension services system supported by ICTs in Tanzania: Progress made, Challenges remain. *International Journal of Education and Development using Information and Communication Technology*, *9*(1), 80-99.

van Etten, J. (2011). Crowdsourcing crop improvement in Sub-Saharan Africa: a proposal for a scalable and inclusive approach to food security. *IDS bulletin*, *42*(4), 102-110.

USAID. (2013). Crowdsourcing Applications for Agricultural Development in Africa, Retrived from https://communities.usaidallnet.gov/ictforag/node/409

Zhang, Y., Wang, L., & Duan, Y. (2016). Agricultural information dissemination using ICTs: A review and analysis of information dissemination models in China. *Information Processing in Agriculture*, *3*(1), 17-29.

About the authors

Camilius A. Sanga Ph.D. is Associate Professor of Informatics, Sokoine University of Agriculture ICT for Development, ICT4D, ICTD. Dr. Sanga's current projects include the role of mobile phones towards improving coverage of agricultural extension services: a case study of maize value chain. Her main goal is to improve the innovative communication and knowledge dissemination to actors in maize value chains.

Email: sanga@suanet.ac.tz

Ruth Haug Ph.D.is from the Department of International Environment and Development Studies, Norwegian University of Life Sciences, Aas, Norway. Her doctorate is from the University of Maryland, USA. Dr. Haug's special interests include agriculture, food- and livelihood security; food policy and hunger, peace and violent conflicts and sustainable use and management of natural resources.

Email: ruth.haug@nmbu.no
http://www.umb.no/statisk/noragric/staff_cv/haug.pdf

Joseph Phillipo, Malongo R.S. Mlozi and **Siza D. Tumbo** are from the Sokoine University of Agriculture, Morogoro, Tanzania.

Editor's Note: This detailed study provides a wealth of useful information from students to guide the design and implementation of online discussion forums.

Dimensions affecting student participation in online discussion forums:
A review of literature and a current investigation
Majed Gharmallah Alzahrani
Saudi Arabia

Abstract

This study was conducted to review the dimensions affecting student participation in online discussion forums (ODFs) from the literature and to investigate these dimensions from students' perspective based on their actual use of ODFs. Initially, a review of a number of studies internationally and in Saudi Arabia was conducted which reveals a number of dimensions that are likely to affect student participation in ODFs. After that, mixed methods design was used to investigate students' perspectives regarding the dimensions raised from the literature and to suggest other dimensions. The sample contained 67 undergraduate students who completed the pre and post online surveys and twelve of them completed interviews. The literature reveal a number of dimensions, but a focus was given to six of them, namely: academic staff presence, peer presence, assessment, appropriateness of topics, technical support, and anonymity. The findings of the current investigation also confirm the importance of these dimensions, particularly the academic staff presence. However, academic staff are challenged to make students participate effectively in ODFs.

Keywords: Online discussion forums (ODFs), student participation, higher education.

Introduction

Online discussion forums (ODFs) are used dramatically in many universities around the world and in Saudi Arabia either as part of the fully online learning or blended learning courses. However, it is recognised that student participation can vary widely from very shallow postings to deeply reflective postings on the topics under discussion (Warren, 2008); that is the quality of participation. Similarly, students may contribute to the ODFs by submitting a high number of posts and may read less or none;, that is the quantity of participation. Therefore, it is important to keep students participating continuously and intensively since this leads to better learning outcomes and higher satisfaction (Alkhalaf, Nguyen, Nguyen, & Drew, 2011, 2013; Pena-Shaff, Altman, & Stephenson, 2005; Swan, 2001). The literature review indicated that student participation in ODFs may vary based on several dimensions such as academic-staff presence, peer presence, assessment, appropriateness of topics, technical support, and anonymity.

Literature review

Academic staff presence

Academic staff presence is seen as one of the major dimensions affecting student participation in ODFs. According to Nandi, Hamilton, and Harland (2012), there are different ideal roles for academic staff such as managerial and instructional design, pedagogical, technical, facilitator and social roles. Academic staff presence can also generate quality interaction in ODFs (Dennen, 2005; Nandi et al., 2012). For example, Jung, Choi, Lim, and Leem (2002) found that social interaction between academic staff and students affected their participation in ODFs positively. An analysis of research findings conducted by Cheung, Hew, and Ling Ng (2008) suggested that

academic staff postings is one of the main dimensions for students to contribute in ODFs, because it motivates them to participate. In particular, timely and substantive feedback can motivate students to achieve higher participation (Dennen, 2005), but timely feedback requires a great amount of time, creating a high workload for academic staff (Xia, Fielder, & Siragusa, 2013). Academic staff guidance and feedback was found to be a critical dimension to motivate students and therefore increase their participation in ODFs (Xie, Debacker, & Ferguson, 2006). In contrast, Pena-Shaff et al. (2005) found that a lack of academic staff feedback negatively affected some student participation in ODFs. Similarly, Mokoena (2013) found that insufficient feedback from academic staff was the strongest reason reported by students for their poor participation in ODFs.

Many researchers also indicated that appropriate academic staff facilitation can promote student participation in ODFs (An, Shin, & Lim, 2009; Gilbert & Dabbagh, 2005; Jung et al., 2002). Therefore, the role of academic should go beyond just giving feedback to advising and guiding the student discussion in order to build a comfortable online environment (AlJeraisy, Mohammad, Fayyoumi, & Alrashideh, 2015; Sebastianelli, Swift, & Tamimi, 2015). For example, in the Saudi higher education context, Alghamdi (2013) found that some students were not participating in ODFs unless they were encouraged by the instructor or when a sample response was provided. Interestingly, familiarity with the facilitator of ODFs in the form of trust and friendship was found to be an important dimension for Asian student participation, because it builds a community feeling (Hew & Cheung, 2010). Importantly, the mentoring role of academic staff was found to be a significant dimension that affects students' perceptions of the quality of online courses utilising ODFs (Sebastianelli et al., 2015). Al-Fahad (2010) cautioned that if ODFs are "not monitored closely, they could prove inconclusive without much help to the participants" (p. 62). However, running effective ODFs is not an easy task for academic staff (AlJeraisy et al., 2015; Fageeh & Mekheimer, 2013; Herrick, Lin, & Tsai, 2011; Song & McNary, 2011). AlJeraisy et al. (2015) declared that it is challenging for academic staff to make the most of using ODFs and to engage students frequently and deeply in a sustained discussion, particularly when facilitating a large ODF, because "the activity's fervor could even be an overwhelming experience" (p. 249). Similarly, Song and McNary (2011) asserted that maintaining student interaction in ODFs is a challenging task.

Peer presence

Peer presence was also found to be a critical dimension that impacts student participation in ODFs. It involves social presence, collaboration, interaction and feedback from peers. For example, Jung et al. (2002) found that collaborative interaction among students affected their participation in ODFs positively. The analysis of research findings conducted by Cheung et al. (2008) also suggested that student posting is a major reason for students to contribute or not contribute in ODFs. Regression analyses conducted by Swan and Shih (2005) revealed that "peer presence is the sole predictor of perceived interaction" (p. 129). Interacting with peers can generate different opinions and make the discussion interesting and therefore motivate students to participate more (Xie et al., 2006). Interestingly, a cultural reason for participation in ODFs by Asian students was found to be the mutual obligation to help each other, which produces a sense of responsibility and obligation leading them to the principle of reciprocity (Hew & Cheung, 2010).

Most importantly, Pena-Shaff et al. (2005) revealed that peer feedback was a critical dimension affecting participation and interaction in ODFs. Recently, Xie (2013) found that peer feedback was a significant predictor of the number of posts in ODFs. Peer feedback has been demonstrated to be a critical dimension that impacts student behaviour in ODFs (Hew & Cheung, 2008). For example, Ertmer et al. (2010) found that peer feedback facilitated students' perceived higher levels of confidence and comfort in posting and responding in ODFs. Most recently, and in

particular in relation to students' writing learning gains, Cheng, Liang, and Tsai (2015) found that cognitive feedback was more helpful for students than was affective feedback (e.g., praising comments) and metacognitive feedback (e.g., reflecting comments), though this effect had diminished gradually by the end of the activity. However, receiving a negative peer feedback could evoke negative emotional responses and thus affect student participation in ODFs negatively (Cheng, Hou, & Wu, 2014). Thus, feedback is important particularly from academic staff, but, most importantly, student participation in ODFs should be marked.

Assessment

Previous research in Saudi higher education indicated that assessment not only could increase student participation in ODFs (Al-Ismaiel, 2013; Al-Jarf, 2005a, 2005b; Alghamdi, 2013; Alkhalaf et al., 2011, 2013), but could also increase the quality of these participations (Al-Ibrahim & Al-Khalifa, 2014). It appeared that requiring students to participate in ODFs was a must. Al-Jarf (2005a) found that the voluntary based participation was one of the barriers contributing to the total failure of using ODFs, as only five participations were made during one semester, as students "reported that they only work if activities are part of the course mark" (Al-Jarf, 2005a, p. 8). Al-Jarf (2005b) stated that "many Saudi college students do extra work for grades only. If online learning is not part of tests and grades, they will not participate" (p. 179). Recently, Alghamdi (2013) also reported that "it seems that students in the Saudi context would rather participate in activities that provide them with grades over those that improve their skills but do not directly enhance their grades" (p. 75). In blended learning courses, Al-Ismaiel (2013) found that if participation in ODFs is required, "then a high frequency of student participation will result" (p. 273). Due to the inadequate quality and content of student participation in mandatory ODFs, Al-Ibrahim and Al-Khalifa (2014) recommended that the weight of the assessment should not be less than 25% of the course final mark, although this proportion was not explained in their study. In order to promote Saudi students' online learning experiences, Alkhalaf et al. (2011, 2013) asserted that students should be encouraged to interact more in collaboration tools such ODFs or even dedicate some of their activities to being completed collaboratively. However, Alghamdi (2013) and Al-Jarf (2004a, 2005b) reported that they could not make student participation in ODFs mandatory nor could they allocate a portion of the course grade for this purpose.

Unsurprisingly, research that has been conducted in other contexts indicated that students are very concerned regarding the assessment of their participation, and they may not participate voluntarily (An et al., 2009; Andresen, 2009; Dennen, 2005; Macdonald, 2003; Palmer, Holt, & Bray, 2008; Pena-Shaff et al., 2005; Swan, Schenker, Arnold, & Kuo, 2007; Vonderwell, 2003; Warren, 2008). For example, Vonderwell (2003) reported that in voluntary ODFs, just three students out of twenty-two posted questions or comments. Similarly, in voluntary ODFs, Dennen (2005) found that "many students did not post any messages during the semester" (p. 140). When participation was assessed, the exact proportion of it was the concern, as found by Pena-Shaff et al. (2005), who reported that students were participating because it was graded, although the 10% allocated for participation was not sufficient to encourage all students. These findings are consistent with Macdonald's finding (2003), that "more students will participate in online collaborative activities if they are linked to assessment" (p. 388), and with Warren's finding (2008) that "students are motivated by assessment and passing the course and will avoid items that do not directly contribute to that goal" (p. 1706). Thus, in order to encourage student participation, academic staff should grade student participation in ODFs and that grade should contribute significantly to their final course mark (Andresen, 2009; Swan et al., 2007). Importantly, assessment does not only limit lurking, but a higher assessment proportion does generate a higher level of cognitive engagement (Dennen, 2005; Zhu, 2006). In other words, the quality of participation is likely to be linked to assessment. It is unfortunate that online discussion

"would be driven by a grade, but it is representative of the larger system of concerns and interests in which universities operate" (Dennen, 2005, p. 146).

It is clear that assessing student participation in ODFs on a regular basis is not an easy task, particularly when there are a large number of students, or the discussions are lengthy (Andresen, 2009). This may show that traditional assessment methods do not fit with online activities, and, at the same time, perhaps more modern methods are required for assessing student participation in ODFs. Darandari and Murphy (2013) asserted that assessment methods have a potential influence on students' learning. They highlighted that "Saudi higher education institutions are under increasing pressure to support the use of flexible and alternative assessment modes" (p. 69). Academic staff may use documented assessment rubrics (e.g., Edelstein & Edwards, 2002; Kleinman, 2005; McNamara & Burton, 2009; Nandi et al., 2012; Rovai, 2000; University of Wisconsin, n.d.). Alternatively, they can use electronic tools to assess student participation, such as data mining (Dringus & Ellis, 2005) or the one offered freely by Shaul (2007). Interestingly, using ODFs may help academic staff to explore the student activities in the online environments (Ismail, Mahmood, & Babiker, 2013; Zouhair, 2010), end consequently assess these activities.

However, assessing student participation may change their behaviour to become assessment driven, so that they just participate to increase their marks regardless of improving learning opportunities (Oliver & Shaw, 2003). Interestingly, it was found that "students whose discussion behaviors were assessed according to specific criteria were likely to participate more interactively in the discussions than students who were assessed for participation alone" (Swan et al., 2007, p. 6). This is reinforced by the recent claim made by AlJeraisy et al. (2015) which emphasised the importance of the academic staff vision which involves issuing clear instructions about the required posts, because "simply obligating students to post comments does not result in higher-order thinking, meaningful content, or continued interaction" (p. 258). For example, Gašević, Adesope, Joksimović, and Kovanović (2015) found that "grading asynchronous online discussions was not sufficient to help students reach higher levels of cognitive presence if the participation guidelines were not detailed enough to help students regulate their learning" (p. 60). Similarly, in structured ODFs, students were found to be more engaged (Salter & Conneely, 2015; Zydney, deNoyelles, & Seo, 2012) and had higher participation levels (Brooks & Jeong, 2006; Ellis & Davidson-Shivers, 2010). The findings of Wozniak and Silveira's study (2004) added that when ODFs are "well structured with initial student orientation to the online learning environment and learning activities showing them how to use asynchronous discussion efficiently; more effective student to student interactivity takes place" (p. 960). Thus, academic staff should pay considerable attention to the course design and provide students with an explained instruction sheet dictating exactly what they have to do in ODFs. Clear expectations are likely to increase student participation in ODFs (Mokoena, 2013). Academic staff also should be able to determine the most interesting topics for online discussions.

Appropriateness of topics

The appropriateness of both course content and discussion topics seems to be an important dimension that needs to be considered when designing ODFs. According to Bender (2003), "courses that are most readily suited to online delivery are those that have the most potential for discussion, such as courses in the humanities, social sciences, and writing." (p. 171). Palloff and Pratt (2007) noted that although the weekly read and discuss strategy has been found to be one of the most successfully employed practices in ODFs, this strategy cannot be employed with all courses, particularly in "science, math, art, or music, which do not lend themselves to the reading and discussion format" (p. 133). In regard to the discussion topics, Xie et al. (2006) found that discussion topics were one of the dimensions that influenced student motivation to participate in online discussions, particularly course-related topics. Similarly, if the discussion topic is relevant to other course activities, it is likely to motivate students, and thus increase their participation

(Dennen, 2005). Thus, "strategically choosing a topic that can be discussed from varied perspectives helps generate higher student interactivity" (Durrington, Berryhill, & Swafford, 2006, p. 191) and possibly increase participation. In the Saudi higher education context, Al-Ismaiel (2013) highlighted the fact that course content should be appropriate for use with ODFs and for the students' individual differences. Al-Ibrahim and Al-Khalifa (2014) also recommended that ODFs be used with theoretical courses as the content of the course might impede the dynamics of interaction. In another context, Sebastianelli et al. (2015) found that, in online courses that utilised ODFs, course content was found to be a stronger predictor of student perceived learning, satisfaction and quality than interaction with academic staff and with peers.

Technical support

Once the considerations of the course design are met, academic staff should make sure of the students accessibility to technology before asking them to participate in ODFs. Students should be able to have access to a reliable Internet connection. Technical issues relating to Internet connectivity and availability may reduce student motivation and ultimately reduce their participation in ODFs. Several studies have indicated that university students in Saudi Arabia have faced such technical issues while using ODFs (Al-Ismaiel, 2013; Al-Jarf, 2004a, 2005a, 2005b, 2005c, 2006; Alamro & Schofield, 2012; Alebaikan & Troudi, 2010; Fageeh & Mekheimer, 2013; Hamdan, 2014b), which are likely to affect their participation level negatively. For example, limited access to ODFs due to Internet connection problems, particularly at university campuses, affected female students' ability to access ODFs at any time, and could potentially create "a digital divide" (Alamro & Schofield, 2012, p. 23). Most importantly, Fageeh and Mekheimer (2013) revealed that technical issues were found to be an important dimension that influences students' attitudes towards using Blackboard, which also included their attitudes towards the collaborative tools within Blackboard such ODFs.

Technical issues also can relate to students ability to properly navigate ODFs and to the provider of ODFs. For example, Al-Jarf (2005a) revealed that the difficulty that students experienced in the mechanism of participation in ODFs was one of the issues that contributed significantly to the total failure of using ODFs. In particular, Alghamdi (2013) found that some students were confused, as they did not reply to the original thread, but rather initiated new ones that duplicated the topics. Thus, the use of ODFs should be explained prior to applying them in higher educational contexts, as many researchers did for students, regardless of the various research findings (e.g. Al-Jarf, 2002, 2004a, 2004b, 2005a, 2005b; Alamro & Schofield, 2012; Alghamdi, 2013; Ismail et al., 2013; Zhu, 2006). With respect to the provider of ODFs, Johnson, Howell, and Code (2005) revealed "benefits of online discussion until the point at which the technology malfunctioned" (p. 61). They explained that the service was intermittent for several days, which not only hindered students' ability submit the required posts, but also affected their motivation after the system became fully operational. Similarly, Mokoena (2013) found that technical issues were one of the reasons for poor participation in ODFs, particularly when the system did not work efficiently. In order to get the best use out of online discussion tools, and to have a beneficial online discussion, it is recommended that students should be provided with technical support (Im & Lee, 2003; Mokoena, 2013) and training workshops associated with the instructions of participation regarding the use of ODFs (Al-Ibrahim & Al-Khalifa, 2014).

Anonymity

The final dimension affecting student participation presented in this study is whether student participation should be anonymous or identified. Anonymity means to participate in ODFs without being identified by way of using a pseudonym. In the online environment, anonymity has many benefits such as: eliminating the fear of isolation (Yun & Park, 2011); offering opportunity to ask more questions to the academic staff (Vonderwell, 2003), clarifying the expectations of new courses (Freeman & Bamford, 2004); allowing a sense of freedom (Palloff & Pratt, 2007);

serving as an equaliser when participants are different (for example, in terms of gender) (Johnson, 1997; Palloff & Pratt, 2007); promoting a deeper level of discussion (Gikas & Grant, 2013); encouraging participation; building coherent and sustained interaction over time (Ahern & Durrington, 1995); increasing the participation levels (Roberts & Rajah-Kanagasabai, 2013); protecting participants who are not ready to discuss sensitive topics publicly (Pendry & Salvatore, 2015); and ensuring the privacy of students data for research purposes (Daries et al., 2014). To use an example, in the university ODFs, anonymity "could help less digitally experienced students catch up with their peers who cannot do without it" (Johnson, 2010, p. 198). In the other side, identified participations could result on students being shamed to ask misunderstanding questions and therefore being less confident to engage in the online community (Aundree Baxter & Haycock, 2014). Northover (2002) suggested that anonymity was to be applied in an initial activity to encourage and support students with language difficulties to participate in ODFs. However, anonymity has the potential for creating integrity problems (Johnson, 1997).

Gender is one of the most important characteristics of personal identity, which has a potential effect on online communication (Guta & Karolak, 2015). In mixed gender public ODFs for Saudi Arabian students temporarily studying in Australia, Madini and de Nooy (2013) found that genders are disclosed "to limit their social contact with the opposite sex" (p. 250). Madini and de Nooy (2013) reported that Saudi students were in a mixed gender society, but "their behavior is shaped by the cultural norms of the segregated Saudi society" (p. 249). In the Saudi higher education context, however, an extraordinary study was conducted by Al-Jarf (2005a) to investigate the effectiveness of collaborative participation in ODFs on students' achievement across-gender from two universities, each gender being from one university. She revealed that the cultural barrier represented in the segregated learning environment was one of the barriers that contributed to the total failure of using ODFs. Al-Jarf (2005a) explained that some students tried to conceal their identity by registering anonymously as they were shy, apprehensive and hesitant to register because they were accustomed to a segregated learning environment. Based on Islamic standards and cultural dimensions, students were respectful and serious, so they did not register in the mixed gender ODFs, even though extra credit was offered (Al-Jarf, 2005a). On the other hand, when gender is unified, anonymity of participation in ODFs could be disadvantageous since it may lead to cheating and unethical practises. Therefore, participating academic staff in Al-Jabry, Salahuddin, and Al-Shazly's study (2014) agreed that the use of ODFs provided students with opportunities to express their identities explicitly in order to avoid unethical practices. All in all, academic staff should consider the aforementioned dimensions that may affect student participation in ODFs in favour of producing an effective learning environment in which students can be engaged in a sustained online discussion.

Research questions

This study aimed to answer the following research questions:

- Q1- Do students perceive the suggested dimensions from the literature as important for participation in ODFs?
- Q2- Are there any other dimensions that may affect student participation in ODFs?

Methodology

Design and sampling

In this study, mixed methods design was implemented. The mixed methods design provides a better understanding of a research problem, an alternative perspective in a study, and builds on the strengths of each method to fully answer the research questions (Creswell & Clark, 2011; Johnson & Onwuegbuzie, 2004; Molina-Azorin, 2012; Teddlie & Tashakkori, 2003). In this

study, both quantitative and qualitative data were collected. The quantitative data were collected through pre and post online surveys whereas the qualitative data were collected through interviews. The population of this study was students at Saudi universities and one of the leading public universities in the Western Region of the country was selected as the sample frame. The convenience sampling technique was followed which resulted in recruiting a sample of 67 male students who agreed to participate voluntary in the online surveys. The students were studying three different undergraduate courses within three classes at the Department of Educational Technology, Faculty of education. They were utilising ODFs as a supplementary pedagogical tool in blended learning courses as a new experience during ten weeks of study. Some of those students also agreed to participate in the interviews at the end of the semester. From those students, four students from each class were randomly selected by the author leading to a total of 12 interviewees.

Pre/post online surveys

These online surveys were one online page that seeks students' responses regarding the importance of the suggested dimensions. The completion of these online surveys was anonymous within five minutes. Students were provided with a computer lab to complete the pre-online survey and the post-online survey respectively only at the beginning of the semester and at the end of it. The aim of this provision was to make sure that the pre-online surveys were completed before engaging in using ODFs and directly after this. The online surveys contained three questions; the first one was to rate the suggested dimensions based on their importance and the second question was to select the most important dimension of them. The final question was to suggest other dimensions that may increase or decrease student participation in ODFs.

Interviews

Interviews can be used in combination with quantitative data in order to confirm or explain any findings in-depth (Creswell, 2012; Johnson & Christensen, 2012; Teddlie & Tashakkori, 2009). In this study, semi-structured interviews were selected as the means for obtaining the required data. The interviews were first written in English and then translated into Arabic to ensure that students had a clear understanding of the interview protocols, because they were not proficient in the English language. The interviews were audio recorded, and interviewees were given the opportunity to review their recording, if they wished to have any part of it erased. In these interviews, students were asked regarding:

> The dimensions that encourage student participation in ODFs.
>
> The dimensions that prevent student participation in ODFs.
>
> Suggestions to improve student participation in ODFs.

Data analysis procedures

The Statistical Package for Social Sciences (SPSS), version 20 was used to facilitate the analysis of the quantitative data. The qualitative data elicited from the interviews were analysed using a process based on the interpretive approach (Mason, 2002). On the basis of volume of data, it was decided to analyse the responses to the open-ended question in the online surveys manually and to facilitate the analysis of the interviews' transcripts by using the qualitative package NVivo, version 10. The 12 interviewees were coded from S1 to S12. In order to enhance the validity of the research findings, quantitative and qualitative findings were triangulated (Bryman, 2012; Creswell, 2012; Creswell & Clark, 2011; Denscombe, 2007; Johnson & Onwuegbuzie, 2004; Mathison, 1988; Teddlie & Tashakkori, 2009). The triangulation process was conducted by comparing and contrasting the results of both analyses. This process ensured the accuracy and credibility of the study findings due to the multiple sources of data collection methods, participants and analysis processes.

Results

Pre/post online surveys analysis

The 67 students were asked about the importance of dimensions that are likely to affect their participation in ODFs before and after using ODFs. Table 1.1 orders these dimensions based on the average of their importance.

Table 1.1
The importance of the dimensions affecting student participation

Dimension	Before using ODFs		After using ODFs		Average	
	M*	SD	M*	SD	M	SD
Academic staff feedback	3.51	.637	3.55	.585	3.53	.468
Appropriateness of topics	3.51	.561	3.45	.610	3.48	.496
Assessment	3.22	.692	3.40	.719	3.31	.535
Help desk	3.25	.636	3.15	.680	3.20	.530
Other students feedback	3.15	.609	3.22	.692	3.19	.556
Anonymity	2.19	.925	2.81	.802	2.50	.669

* Using Likert scale with range of 1= not important to 4 = very important.

Overall, the results in Table 1.1 show that students perceived the academic staff feedback to be a very important dimension before and after using ODFs, while anonymity was perceived as being of little importance. In addition, students were also asked to select the most important dimension from these dimensions, and the results are ordered in Table 1.2 based on the frequency of the most important dimension.

Table 1.2
The Most Important Dimension Affecting Student Participation

Dimension	Before using ODFs		After using ODFs		Total	
	N	%	N	%	N	%
Academic staff feedback	33	49.3	32	47.8	65	48.51
Appropriateness of topics	15	22.4	20	29.9	35	26.12
Assessment	11	16.4	7	10.4	18	13.43
Other students feedback	7	10.4	4	6.0	11	8.21
Anonymity	0	0.0	3	4.5	3	2.24
Help desk	1	1.5	1	1.5	2	1.49

The results in Table 1.2 confirm that academic staff feedback is the most important dimension, as reported before and after the using ODFs, and appropriateness of topic was seen as the second most important dimension. It was noticed that the appropriateness of topic and anonymity dimensions were perceived as being more important after using ODFs, while the opposite was the

case for the assessment and other students feedback. Additionally, anonymity and a help desk were the least important dimensions before and after using ODFs.

In regard to the open-ended question findings, overall, they suggested that educational competitions in ODFs are likely to increase their participation. However, they noted that the Internet connection is seen as a common issue that hinders the use of ODFs.

Interview findings

Interviewees reported that there are some dimensions that are likely to encourage student participation and other dimensions that are likely to prevent students from participation in ODFs.

Dimensions encouraging participation

In regard to the dimensions encouraging participation, participants were initially asked about the suggested dimensions that were in the online surveys. They also were given the opportunity to report any other dimensions based on the experience of using ODFs. The findings reveal that all participants agreed that assessing participation was perceived as the most important dimension to increase student participation. For example, when S3 was asked regarding the reason behind the importance of assessment he replied:

> *…because you do not want to lose marks. So, for sure you will participate more.*

In addition, feedback either from academic staff or other students, especially if it was positive, was also perceived to be an important dimension by all participants, with the exception of S3 who was neutral towards his peers' feedback. S9 concentrated more on academic staff feedback, reporting that:

> *…academic staff feedback will increase my participation particularly if you missed something in your topic, you might receive a reply from a peer albeit these replies can sometimes be very general. But, if the lecturer is replying to you, he'd usually give you an in-depth reply and a detailed one. In addition, he will be able to see the weak points in your topic (S9, 11th December 2013).*

Interestingly, S6 focused more on the positive feedback from his peers, although this was not the case with academic staff:

> *…some students give only destructive feedback, but constructive views by student are helpful...But academic staff members are helpful in all respects.*
> *(S6, 12th December 2013).*

Moreover, similar to students' feedback, the appropriateness of topics was also perceived as an important dimension by all participants, with exception of the S3 who was neutral towards this dimension. S2's agreement to this finding was a typical example:

> *Yes, whenever there is a background about the topic, the participation will be better*
> *(S2, 10th December 2013).*

It was also found that the technical side of the ODFs represented in the help desk is an important dimension, as noted by 10 students. However, S3 and S12 did not see the help desk as a helpful dimension as the 10 students did. For instance, S9 asserted the importance of the help desk not only for himself, but also for all members of the ODFs by saying:

> *Any member of the online discussion forum and I, need to contact the help desk and to get a quick response when it is needed. This will increase the interaction and then will increase the number of participations (S9, 11th December 2013).*

It was obvious that participants gave the least importance to anonymity, although that was still highly important, as noted by eight participants. Half of participants (S1, S2, S4, S7, S10, and S11) agreed that anonymous participation is most convenient for them. Based on the experience of participating in the ODFs in this study, S2 gave a realistic example as he said:

> *...I commented on a student's post because his post was long... If I was participating by my real name, I will not be able to comment like that, because of the sensitivity between the students. Therefore, I think anonymity would increase the student participation (S2, 10th December 2013).*

Interestingly, a neutral position regarding anonymity was the case of S8, while in contrast to previous participants, explicit participation by their real name was the preferred method for S3, S5, S6, S9 and S12 in order to compete against each other. Although students were required to register anonymously by using codes, S5 insisted on disclosing his identity by uploading his personal image in his profile. S6 also disagreed with being anonymous and pointed out that:

> *I personally do not prefer the anonymous participation within educational contexts... Using the real names will lead students to compete between each other in their participation as they usually do in anything, they will do more in such online discussion forum (S6, 12th December 2013).*

The interaction, between students and with the lecturer was also seen to be another important dimension for increasing student participation in ODFs (S6, S7, S8, S10 & S12). This additional dimension can be related to the academic staff and peer presence, which confirmed their importance. According to S12, interaction creates a kind of competition between students:

> *When each one of my peers submits a topic that has a good format and with pictures, this motivates everybody to be more enthusiastic and to compete with others...I mean, if there is interaction between the online discussion forum participants (S12, 11th December 2013).*

Other encouraging participation dimensions mentioned were the nature of participation in ODFs, which requires the student to search for information, summarise it and then post it into ODFs to help others, as well as requiring students to complete some tasks through ODFs (S5). In addition, selecting a suitable time to participate was seen as an important dimension. S9 suggested participating directly after taking the traditional class, asserting that this creates the possibility of more interaction. In fact, this was the preferred time of participation for S5, as he confirmed by saying:

> *Sometimes I used to allocate a specific time after returning from the lecture. But if I got something else to do in this time, I cannot participate (S5, 10th December 2013).*

These dimensions suggested by interviewee can be attributed to the academic staff presence in terms of construction of the ODFs.

Dimensions preventing participation

Nevertheless, participants reported that there were some dimensions that may prevent students from participation in ODFs. In this regard, participants were given the opportunity to report any hindrance dimensions that might prevent them from participation. The limited time participants had was seen as the most preventative dimension due to the high loads of studying (S4 & S6) and due to other commitments (S4, S5, S10 & S11). A typical example is what S4 illustrated:

> *...the high study load with many assignments during this semester hindered me from participating. If I had enough time, I would have participated better, but my situation did not help (S4, 11th December 2013).*

According to S2 this can be worse when you have long posts to read. However, S7 and S8 argued that dedicating a special time for participation makes participation achievable with other commitments, as S7 clarified that:

> *…participation in the online discussion forum does not take a long time if the student dedicated some time for it. It is once a week around 10 to 15 minutes where the student can read the submitted topics, discuss them, and submit his own topic. So, it does not take a long time if the student dedicated time for it (S7, 10th December 2013).*

Students, S5 and S11 also confirmed that participation does not consume a considerable amount of time, but other commitments hindered them from participation as mentioned earlier. One of them asserted that:

> *My participations do not take a considerable time as the longest one takes from 10 to 15 minutes (S11, 9th December 2013).*

It was also reported that using ODFs in educational contexts was a new experience for some students (S2, S4, S6, S7 & S10). Therefore, they had some difficulties at the beginning of using ODFs, such as logging into the ODFs, but that was resolved after the first week of study. Those who mentioned this said something like:

> *…there were some difficulties with using the forum. It was explained, but I may have not understood it fully (S4, 11th December 2013).*

In fact, the use of ODFs was explained by the author before starting using them, and some students had previous experience in using ODFs (S4, S7, S9, S11 & S12), though S4 had some difficulties. In addition, other students did not report any difficulty and two of them (S1 and S3) asserted that it was very clear and not complicated. Overall, this shows that both familiarity and unfamiliarity with using ODFs almost disappeared into a situation of equality. In addition, the technical side represented by the availability of the Internet connection or its quality was viewed as a preventative dimension by S2, S9, S11 and S12. It was also reported that this can be the case for their peers, especially those who live in rural areas (S7 & S12). For example, S12 was unhappy with the quality of the Internet and stated that:

> *You can say the Internet connection is very bad and unstable which is not like other countries. This does not motivate anybody to work, so the Internet is the biggest barrier (S12, 11th December 2013).*

In addition, not having a device by which to access the Internet was an issue for S11. Other participants did not report any problem with the technical side. Moreover, the neglecting of students was a hindrance dimension, as declared by some of them (S2, S10 & S11). These participants reported that they used to forget to submit the required tasks on the ODFs. S2 explained this issue stating that:

> *…first of all is the forgetfulness. Everyone forgets when he doesn't practice. Secondly, during the holidays everyone forgets to post… Will, forgetfulness is that I am in my last semester which requires some field work obligations. So, we forget about the online discussion forum. In relation to the holidays, everyone forgets about the whole study things (S2, 10th December 2013).*

It was also reported that the use of ODFs with other ICT tools such social media applications at the same time was considered to be a preventative dimension. A student (S12) reported that using ODFs was a kind of time wasting and stated that:

> *Frankly, the lecturer was communicating with us through WhatsApp and Facebook and we were comfortable with that. The obstacle was repeating the same topics in the online discussion forum (S12, 11th December 2013).*

Another student in the same class (S11) also was confused due to the multiple uses of ICT tools with ODFs and emphasised this issue by saying:

> ...the problem probably was from the lecturer as he used to upload the topics on Facebook and number them. There was a problem with the number of the topics during the first two weeks of study, so we got confused with regard to which topic to start with in the online discussion forum (S11, 9th December 2013).

Discussion and conclusion

Generally speaking, the results of both quantitative and qualitative data indicate that students perceived the suggested dimensions as being important ones that are likely to have a substantial effect on student participation in ODFs. The quantitative results of the online surveys indicate that they perceived the suggested dimensions as important for student participation in ODFs, but that anonymity was of little importance (see Table 1.1). The results indicate that academic staff feedback was seen as being the most important dimension and that the appropriateness of topics was seen as the second most important dimension (see Table 1.2). The qualitative findings from the interviews confirm that the suggested dimensions were important for student participation in ODFs. Although some participants did not perceive anonymity as an important dimension, half of them did perceive it as an important dimension. The findings also reveal that academic staff feedback and assessment are the most important dimensions, as mentioned by all of the interviewees. It is clear that students had some doubts regarding the importance of the technical support and anonymity, but that does not mean they are not important rather the students perceived them as of little importance compared to the other dimensions raised from the literature.

The importance of the suggested dimensions brings to our mind the community of inquiry model in a text-based environment as proposed by Garrison, Anderson, and Archer (2000), which comprises three overlapping core elements: cognitive presence, social presence and teaching presence. In ODFs, cognitive presence can be defined as the ability of students to construct and confirm meaning through sustained reflection upon and discourse in the topics under discussion (Garrison et al., 2000). Social presence can be defined as students' ability to interact socially and emotionally in ODFs as real people (Garrison et al., 2000), such as interaction with academic staff or with peers to give feedback for the topics under discussion. Teaching presence involves the design of the educational experience and the facilitation process which may include selecting the appropriate topics for discussion, giving feedback, assessing student participation, constructing participation, and providing technical support. Most importantly, maintaining adequate levels of social and teaching presence can significantly enhance cognitive presence (Garrison et al., 2000; Prasad, 2009; Wang & Chen, 2008), which in turn is likely to lead to a more effective online discussion.

In both the open-ended question in the online surveys and in the interviews, participating students suggested some other dimensions in order to increase student participation in ODFs such as making educational competitions and determining the suitable time for participation. These dimensions can be also affiliated to the academic staff role in the ODFs which confirms the importance of academic staff presence in such online environments. Students also should be advised by the course coordinator of taking affordable studying load based on their academic performances within the official range for undergraduate students within the Saudi universities. High study load could hinder not only student participation of ODFs, but also their overall achievement. Academic staff should also advise students to make the best efforts to fitful the academic requirements and make every student diligent and eager to learning. Those academic staff who are interested to use technology in order to enhance the traditional learning, should pay a great attention to the availability of technology to students and to introduce it gradually. For

example, the Internet connection seems to be a pre-requirement element for such online learning environments. Qualitative findings of both the open-ended question in the online surveys and the interviews asserted that Internet connection is a substantial issue that may prevent student from participation in ODFs. These findings assured that making proper student participation in ODFs is a challenge for academic staff (AlJeraisy et al., 2015; Fageeh & Mekheimer, 2013; Herrick et al., 2011; Song & McNary, 2011).

In conclusion, the use of ODFs to enhance the traditional learning appears to be beneficial. However, academic staff should make every possible effort to make this integration successful. Importantly, the dimensions mentioned in the present study are to be considered in order to use ODFs effectively and to have satisfactory student participation in ODFs.

References

Ahern, T. C., & Durrington, V. (1995). Effects of anonymity and group saliency on participation and interaction in a computer-mediated small-group discussion. *Journal of Research on Computing in Education, 28*(2), 133-147.

Al-Fahad, F. N. (2010). The learners' satisfaction toward online e-learning implemented in the college of applied studies and community service, King Saud University, Saudi Arabia: Can e-learning replace the conventional system of education? *Turkish Online Journal of Distance Education, 11*(2), 61-72.

Al-Ibrahim, A., & Al-Khalifa, H. S. (2014, November). *Observing online discussions in educational social networks: A case study.* Paper presented at the International Conference on Web and Open Access to Learning, Dubai, United Arab Emirates.

Al-Ismaiel, O. A. (2013). *Collaborative blended learning with higher education students in an Arabic context.* Unpublished doctoral dissertation, University of Wollongong, Wollongong, New South Wales, Australia.

Al-Jabry, H., Salahuddin, M., & Al-Shazly, A.-L. (2014). Developing and piloting a literature course learnable via Blackboard for EFL literature instruction. *Studies in Literature and Language, 8*(1), 85-95.

Al-Jarf, R. S. (2002, June). *Effect of online learning on struggling ESL college writers.* Paper presented at the 23rd National Educational Computing Conference, San Antonio, Texas, United States.

Al-Jarf, R. S. (2004a, November). *Differential effects of online instruction on a variety of EFL courses.* Paper presented at the 3rd Annual Meeting of the Asia Association of Computer Assisted Language Learning (AsiaCALL), Penang, Malaysia.

Al-Jarf, R. S. (2004b). The effects of web-based learning on struggling EFL college writers. *Foreign Language Annals, 37*(1), 49-57.

Al-Jarf, R. S. (2005a, November). *Connecting students across universities in Saudi Arabia.* Paper presented at the Annual Meeting of the Asia Association of Computer Assisted Language Learning (AsiaCALL), Gyeongju, South Korea.

Al-Jarf, R. S. (2005b). The effects of online grammar instruction on low proficiency EFL college students' achievement. *The Asian EFL Journal Quarterly, 7*(4), 166-190.

Al-Jarf, R. S. (2005c, November). *Using three online course management systems in EFL instruction.* Paper presented at the 4th Asia CALL Conference, Gyeongju, South Korea.

Al-Jarf, R. S. (2006, August). *Impact of online instruction on EFL students' cultural awareness.* Paper presented at the APETAU Conference, Amman, Jordan.

Alamro, A. S., & Schofield, S. (2012). Supporting traditional PBL with online discussion forums: A study from Qassim Medical School. *Medical Teacher, 34*, 20-24.

Alebaikan, R., & Troudi, S. (2010). Online discussion in blended courses at Saudi Universities. *Procedia - Social and Behavioral Sciences, 2*(2), 507-514.

Alghamdi, A. (2013). Pedagogical implications of using discussion board to improve student learning in higher education. *Higher Education Studies, 3*(5), 68-80.

AlJeraisy, M. N., Mohammad, H., Fayyoumi, A., & Alrashideh, W. (2015). Web 2.0 in education: The impact of discussion board on student performance and satisfaction. *The Turkish Online Journal of Educational Technology, 14*(2), 247-259.

Alkhalaf, S., Nguyen, J., Nguyen, A., & Drew, S. (2011, December). *The potential role of collaborative learning in enhancing e-learning systems: Evidence from Saudi Arabia.* Paper presented at the Australasian Society for Computers in Learning in Tertiary Education Conference: Changing Demands, Changing Directions, Hobart, Tasmania, Australia.

Alkhalaf, S., Nguyen, J., Nguyen, A., & Drew, S. (2013). Online learner satisfaction and collaborative learning evidence from Saudi Arabia. *International Journal of Information and Communication Technology Education, 9*(2), 66-78.

An, H., Shin, S., & Lim, K. (2009). The effects of different instructor facilitation approaches on students' interactions during asynchronous online discussions. *Computers & Education, 53*(3), 749-760.

Andresen, M. A. (2009). Asynchronous discussion forums: Success factors, outcomes, assessments, and limitations. *Educational Technology & Society, 12*(1), 249-257.

Aundree Baxter, J., & Haycock, J. (2014). Roles and student identities in online large course forums: Implications for practice. *International Review of Research in Open & Distance Learning, 15*(1), 20-40.

Bender, T. (2003). *Discussion-based online teaching to enhance student learning: Theory, practice, and assessment.* Sterling, VA: Stylus Publishing.

Brooks, C. D., & Jeong, A. (2006). Effects of pre-structuring discussion threads on group interaction and group performance in computer-supported collaborative argumentation. *Distance Education, 27*(3), 371-390.

Cheng, K.-H., Hou, H.-T., & Wu, S.-Y. (2014). Exploring students' emotional responses and participation in an online peer assessment activity: A case study. *Interactive Learning Environments, 22*(3), 271-287.

Cheng, K.-H., Liang, J.-C., & Tsai, C.-C. (2015). Examining the role of feedback messages in undergraduate students' writing performance during an online peer assessment activity. *The Internet and Higher Education, 25*, 78-84.

Cheung, W. S., Hew, K. F., & Ling Ng, C. S. (2008). Toward an understanding of why students contribute in asynchronous online discussions. *Journal of Educational Computing Research, 38*(1), 29-50.

Creswell, J. W. (2012). *Educational research planning, conducting and evaluating quantitative and qualitative research* (4th ed.). Boston: Pearson.

Creswell, J. W., & Clark, V. L. P. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

Darandari, E., & Murphy, A. (2013). Assessment of student learning. In L. Smith & A. Abouammoh (Eds.), *Higher education in Saudi Arabia: Achievements, challenges and opportunities* (pp. 61-71). Dordrecht, Netherlands, Europe: Springer.

Daries, J. P., Reich, J., Waldo, J., Young, E. M., Whittinghill, J., Ho, A. D., et al. (2014). Privacy, anonymity, and big data in the social sciences. *Communications of the ACM, 57*(9), 56-63.

Dennen, V. P. (2005). From message posting to learning dialogues: Factors affecting learner participation in asynchronous discussion. *Distance Education, 26*(1), 127-148.

Dringus, L. P., & Ellis, T. (2005). Using data mining as a strategy for assessing asynchronous discussion forums. *Computers & Education, 45*(1), 141-160.

Durrington, V. A., Berryhill, A., & Swafford, J. (2006). Strategies for enhancing student interactivity in an online environment. *College Teaching, 54*(1), 190-193.

Edelstein, S., & Edwards, J. (2002). If you build it, they will come: Building learning communities through threaded discussions. Online Journal of Distance Learning Administration, V(I). Retrieved September 8, 2015, from http://www.westga.edu/~distance/ojdla/spring51/edelstein51.html

Ellis, H. H., & Davidson-Shivers, G. V. (2010, June). *Impact of discussion structure on student participation in online discussions.* Paper presented at the World Conference on Educational Media and Technology, Toronto, Canada.

Ertmer, P. A., Richardson, J. C., Lehman, J. D., Newby, T. J., Xi, C., Mong, C., et al. (2010). Peer feedback in a large undergraduate blended course: Perceptions of value and learning. *Journal of Educational Computing Research, 43*(1), 67-88.

Fageeh, A., & Mekheimer, M. (2013). Effects of Blackboard on EFL academic writing and attitudes. *The JALTCALL Journal, 9*(2), 169-196.

Freeman, M., & Bamford, A. (2004). Student choice of anonymity for learner identity in online learning discussion forums. *International Journal on E-Learning, 3*(3), 45-53.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2-3), 87-105.

Gašević, D., Adesope, O., Joksimović, S., & Kovanović, V. (2015). Externally-facilitated regulation scaffolding and role assignment to develop cognitive presence in asynchronous online discussions. *The Internet and Higher Education, 24*, 53-65.

Gikas, J., & Grant, M. M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media. *The Internet and Higher Education, 19*, 18-26.

Gilbert, P. K., & Dabbagh, N. (2005). How to structure online discussions for meaningful discourse: A case study. *British Journal of Educational Technology, 36*(1), 5-18.

Guta, H., & Karolak, M. (2015). Veiling and blogging: Social media as sites of identity negotiation and expression among Saudi women. *Journal of International Women's Studies, 16*(2), 115-127.

Hamdan, A. (2014b). The reciprocal and correlative relationship between learning culture and online education: A case from Saudi Arabia. *International Review of Research in Open & Distance Learning, 15*(1), 309-336.

Herrick, M. J., Lin, M.-F. G., & Tsai, H.-W. (2011). *Online discussions: The effect of having two deadlines.* Paper presented at the Society for Information Technology & Teacher Education International Conference, Nashville, Tennessee, United States.

Hew, K. F., & Cheung, W. S. (2008). Attracting student participation in asynchronous online discussions: A case study of peer facilitation. *Computers & Education, 51*(3), 1111-1124.

Hew, K. F., & Cheung, W. S. (2010). Possible factors influencing Asian students' degree of participation in peer-facilitated online discussion forums: A case study. *Asia Pacific Journal of Education, 30*(1), 85-104.

Im, Y., & Lee, O. (2003). Pedagogical implications of online discussion for preservice teacher training. *Journal of Research on Technology in Education, 36*(2), 155-170.

Ismail, A. O., Mahmood, A. K., & Babiker, A. E. (2013). Computer labs: Training undergraduate students on an online lab by using asynchronous discussion forum as an online learning tool. *International Journal of Scientific and Engineering Research, 4*(11), 1109-1114.

Johnson, B., & Christensen, L. (2012). *Educational research: Quantitative, qualitative, and mixed approaches* (4th ed.). Thousand Oaks, CA: Sage.

Johnson, B., & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26.

Johnson, D. G. (1997). Ethics online. *Communications of the ACM, 40*(1), 60-65.

Johnson, G. M., Howell, A. J., & Code, J. R. (2005). Online discussion and college student learning: Toward a model of influence. *Technology, Pedagogy and Education, 14*(1), 61-76.

Johnson, M. (2010, May). *Anonymity in online discussion forums – Does it promote connections?* Paper presented at the 7th International Conference on Networked Learning, Aalborg, Denmark.

Jung, I., Choi, S., Lim, C., & Leem, J. (2002). Effects of different types of interaction on learning achievement, satisfaction and participation in web-based instruction. *Innovations in Education and Teaching International, 39*(2), 153-162.

Kleinman, S. (2005). Strategies for encouraging active learning, interaction, and academic integrity in online courses. *Communication Teacher, 19*(1), 13-18.

Macdonald, J. (2003). Assessing online collaborative learning: Process and product. *Computers & Education, 40*(4), 377-391.

Madini, A. A., & de Nooy, J. (2013). Disclosure of gender identity in Internet forums: A case study of Saudi Arabian forum communication. *Gender, Technology and Development, 17*(3), 233-257.

Mason, J. (2002). *Qualitative researching* (2nd ed.). London: Sage.

McNamara, J., & Burton, K. (2009). Assessment of online discussion forums for law students. *Journal of University Teaching & Learning Practice, 6*(2), 1-14.

Mokoena, S. (2013). Engagement with and participation in online discussion forums. *The Turkish Online Journal of Educational Technology, 12*(2), 97-105.

Molina-Azorin, J. F. (2012). Mixed methods research in strategic management: Impact and applications. *Organizational Research Methods, 15*(1), 33-56.

Nandi, D., Hamilton, M., & Harland, J. (2012). Evaluating the quality of interaction in asynchronous discussion forums in fully online courses. *Distance Education, 33*(1), 5-30.

Northover, M. (2002, December). *Online discussion boards - Friend or foe?* Paper presented at the 19th Annual Conference of the Australian Society for Computers in Learning in Tertiary Education, Auckland, New Zealand.

Oliver, M., & Shaw, G. P. (2003). Asynchronous discussion in support of medical education. *Journal of Asynchronous Learning Networks, 7*(1), 56-67.

Palloff, R. M., & Pratt, K. (2007). *Building learning communities online: Effective strategies for the virtual classroom* (2nd ed.). San Francisco: John Wiley & Sons.

Palmer, S., Holt, D., & Bray, S. (2008). Does the discussion help? The impact of a formally assessed online discussion on final student results. *British Journal of Educational Technology, 39*(5), 847-858.

Pena-Shaff, J., Altman, W., & Stephenson, H. (2005). Asynchronous online discussions as a tool for learning: Students' attitudes, expectations, and perceptions. *Journal of Interactive Learning Research, 16*(4), 409-430.

Pendry, L. F., & Salvatore, J. (2015). Individual and social benefits of online discussion forums. *Computers in Human Behavior, 50*, 211-220.

Prasad, D. (2009). Empirical study of teaching presence and critical thinking in asynchronous discussion forums. *International Journal of Instructional Technology and Distance Learning, 6*(11), 3-26.

Roberts, L. D., & Rajah-Kanagasabai, C. J. (2013). "I'd be so much more comfortable posting anonymously": Identified versus anonymous participation in student discussion boards. *Australasian Journal of Educational Technology, 29*(5), 612-625.

Rovai, A. P. (2000). Online and traditional assessments: What is the difference? *The Internet and Higher Education, 3*(3), 141-151.

Salter, N. P., & Conneely, M. R. (2015). Structured and unstructured discussion forums as tools for student engagement. *Computers in Human Behavior, 46*, 18-25.

Sebastianelli, R., Swift, C., & Tamimi, N. (2015). Factors affecting perceived learning, satisfaction, and quality in the online MBA: A structural equation modeling approach. *Journal of Education for Business, 90*(6), 296-305.

Shaul, M. (2007). Assessing online discussion forum participation. *International Journal of Information and Communication Technology Education, 3*(3), 39-46.

Song, L., & McNary, S. W. (2011). Understanding students' online interaction: Analysis of discussion board postings. *Journal of Interactive Online Learning, 10*(1), 1-14.

Swan, K. (2001). Virtual interactivity: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education, 22*(2), 306-331.

Swan, K., Schenker, J., Arnold, S., & Kuo, C.-L. (2007). Shaping online discussion: Assessment matters. *e-mentor, 1*(18), 1-6.

Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks, 9*(3), 115-136.

Teddlie, C., & Tashakkori, A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social & behavioral research* (pp. 3-50). Thousand Oaks, CA: Sage.

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Thousand Oaks, CA: Sage.

University of Wisconsin. (n.d.). Online discussion rubric. Retrieved June 19, 2013, from http://www2.uwstout.edu/content/profdev/rubrics/discussionrubric.html

Vonderwell, S. (2003). An examination of asynchronous communication experiences and perspectives of students in an online course: A case study. *The Internet and Higher Education, 6*(1), 77-90.

Wang, Y.-m., & Chen, V. D.-T. (2008). Essential elements in designing online discussions to promote cognitive presence - A practical experience. *Journal of Asynchronous Learning Networks, 12*(3-4), 157-177.

Warren, C. M. J. (2008, February). *The use of online asynchronous discussion forums in the development of deep learning among postgraduate real estate students.* Paper presented at the CIB International Conference on Building Education and Research, Kandalama, Sri Lanka.

Wozniak, H., & Silveira, S. (2004, December). *Online discussions: Promoting effective student to student interaction.* Paper presented at the 21st Australasian Society for Computers in Learning in Tertiary Education Conference, Perth, WA, Australia.

Xia, J., Fielder, J., & Siragusa, L. (2013). Achieving better peer interaction in online discussion forums: A reflective practitioner case study. *Issues in Educational Research, 23*(1), 97-113.

Xie, K. (2013). What do the numbers say? The influence of motivation and peer feedback on students' behaviour in online discussions. *British Journal of Educational Technology, 44*(2), 288-301.

Xie, K., Debacker, T. K., & Ferguson, C. (2006). Extending the traditional classroom through online discussion: The role of student motivation. *Journal of Educational Computing Research, 34*(1), 67-89.

Yun, G. W., & Park, S.-Y. (2011). Selective posting: Willingness to post a message online. *Journal of Computer-Mediated Communication, 16*(2), 201-227.

Zhu, E. (2006). Interaction and cognitive engagement: An analysis of four asynchronous online discussions. *Instructional Science, 34*(6), 451-480.

Zouhair, J. (2010). Utilizing JUSUR in an information systems course. *International Journal of Education and Development using Information and Communication Technology, 6*(4), 114-121.

Zydney, J. M., deNoyelles, A., & Seo, K. K.-J. (2012). Creating a community of inquiry in online environments: An exploratory study on the effect of a protocol on interactions within asynchronous discussions. *Computers & Education, 58*(1), 77-87.

About the author

Dr. Majed Gharmallah Alzahrani is an assistant professor at the Department of Curriculum and Teaching Methods, Faculty of Education, University of Jeddah, Saudi Arabia. Dr. Alzahrani received a Bachelor degree in Computer Education from King Abdulaziz University, Jeddah, Saudi Arabia. He also received a Master degree in Educational studies (Computer Education) and a PhD in Education (Computer Education) from the University of Newcastle, Newcastle, Australia. Dr. Alzahrani's major research direction includes online learning and blended learning.

E-mail: mgalzahrani@uj.edu.sa

Blended learning in selected journals: a content analysis using the Complex Adaptive Blended Learning Systems

Mohd Azli Yeop, Kung Teck Wong and Noraini Mohamed Noh

Malaysia

Abstract

This study focuses on the content analysis method and its finding towards the Blended learning approach by means of literature review. It is carried out by using selected journals available online from the Education Resources Information Center (ERIC) which are then analysed with *Complex Adaptive Blended Learning Systems*, introduced by Wang, Han & Yang (2015). The authors are convinced that this method will systematically and accurately improve our overall understanding towards the blended learning approach based on literature review and produce a complete overview towards the research field related to this learning approach. This method will also lead to profound knowledge on the dynamic features and natural properties of the blended learning approach.

In this study, the content analysis research is conducted on 42 empirical studies from the current literature review. Findings show certain gaps in current practices and studies on blended learning that will further increases our insight into potential features that are less highlighted in this new learning approach. The result of this study intends to: 1) clearly explain the existing gap within the studies on blended learning in the education field; and 2) enhance our knowledge on previous findings as well as needs that must be achieved within the practices and studies on blended learning in Malaysia.

Keywords: blended learning, complex adaptive blended learning systems, content analysis

Introduction

Nowadays, every aspect of our lives depends so much on technology and its development has affected us socially, economically, politically, even in our culture and education. According to Kong et al. (2014), the development of computer technology is very dynamic and futuristic; therefore, many hardwares, softwares and changes to the technology have evolved to fulfil the needs of our lives in the 21st century. Changes to the technology's features, particularly the world-wide-web, have greatly enhanced the usage of technology. This has opened doors to educators to find the best method through technology in order to produce learning environments that can meet the various learning styles and needs of the learners; and hence, lead to meaningful learning. According to Kern & Rubin (2012), the usage of technology in teaching and learning is an undeniable need. The effective usage of technology in learning approaches will produce interesting and meaningful learning environments.

Studies have revealed that using technology in the process of learning would increase interest, motivation, improve attention span and produce positive mindset towards learning (Bitner & Bitner, 2002; Nguyen, 2015). Abdul Latif & Lajiman (2011) also agreed that using different methods and technology in the activity of learning could positively stimulate learners' acceptance towards the learning process and enable them to achieve the targeted scores. Moreover, the integration of web technology in the learning process would also improve learning efficacy (Alwehaibi, 2015; Briggs, 2014; Simelane & Mji, 2014). As such, the traditional practices in

schools must be change and transform to a more innovative learning approach, such as Blended learning.

What is Blended learning? Blended learning has been defined over and over again in previous studies. However, none of them gives a complete overview of the origin of blended learning and how each of the component comes together to achieve the intended result. Based on brief summarrization of the previous studies, most scholars defined blended learning as a combination of face-to-face instruction and online-mediated instruction (Briggs, 2014; Graham, 2006; Wong, Tatnall, & Burgess, 2014).

Singh (2003), describes blended learning as a combination of effective knowledge presentation methods in order to support meaningful learning processes to the learners. Mohamed Amin, Norazah, & Ebrahim (2014) on the other hand, defined blended learning in four ways: i) a combination of web-based technologies in the process of learning; ii) a combination of learning pedagogy approaches; iii) a combination of instructional technology and face-to-face instruction; and iv) a combination of instructional technology and learner's learning assignment.

Furthermore, Zaharah, Saedah, Ghazali, & Nur Hasbuna (2015), explain that blended learning is a combination of the conventional learning model and online learning. As such, learners are expected to actively involved in learning process until they personally identified a learning method that work best for themselves. In this process, teachers only function as mediator, facilitator or a companion to create a meaningful and conducive learning environment. It is convinced that blended learning will eventually enhance the conventional learning model by means of the advanced technology nowadays. The overview of blended learning concept is shown in Figure 1.
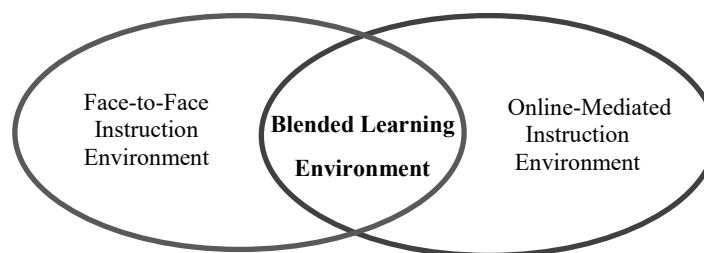
Figure 1 Concept of Blended Learning

In other words, blended learning is a learning process based on a combination of components which include various presentation methods and learning models compliance while fulfilling individual learning style (Mohd Azli, Wong, & Noraini, 2016). This process is conducted in a meaningful and interactive learning environment in order to achieve the objectives of learning.

Why need to conduct blended learning? According to Ozgen Korkmaz & Ufuk Karakus (2009), Yapici & Akbayin (2012), Almasaeid (2014) and VanDerLinden (2014), blended learning could produce abiding learning and increase the necessary skills required to survive in the 21st century globalization. Besides, it is also cost-effective while providing meaningful learning environment.

In this study, the analysis on literature review is based on reports related to blended learning in education dated from January 2015 until July 2016 and published online from the Education Resources Information Center (ERIC) database. The result of this study intends to clearly explain the gap of previous studies related to blended learning; gap in terms of the previous system analysis approach in understanding the practices and studies on blended learning. Besides, this study also aims to enhance our knowledge on previous findings as well as the necessary needs

that must be achieve within the practices and studies on blended learning. In order to achieve these, the content of those reports are analysed from different perspectives by using the Complex Adaptive blended learning Systems introduced by Wang, Han, & Yang (2015). There are actually plenty of issues to discuss related to blended learning in education.

Complex Adaptive Blended Learning Systems

The basic of the construction idea of Complex Adaptive Blended Learning Systems is from the Complex Adaptive Systems Framework which was initially constructed in physics, mathematics and chemistry. This system was used to enhance knowledge towards some dynamically complex themes and non-linear systems such as the nerves, ecology, galaxy and social systems (S. Chan, 2001).

> Complex adaptive systems are described as being living, open systems that "exchange matter, energy, or information across its boundaries and use that exchange of energy to maintain its structure" (Cleveland, 1994)

Based on the development of current technology, the learning systems nowadays are more complex and dynamic. Wang et al. (2015) suggested a six-dimensional subsystems for the learning system through Complex Adaptive Blended Learning Systems. These six subsystems would interact with each other in a non-linear and dynamic way, as in congruent with the other Complex Adaptive Systems. At the same time, each of these subsystems owned its features or characteristic, able to self-motivate while dependent on each other to maintain competitiveness. Moreover, each subsystem would have its own subsystems and they would interact with one another to form a blended learning system. Figure 2 below shows the six subsystems and their connection: learner; teacher; technology; content; learning support; and institution.
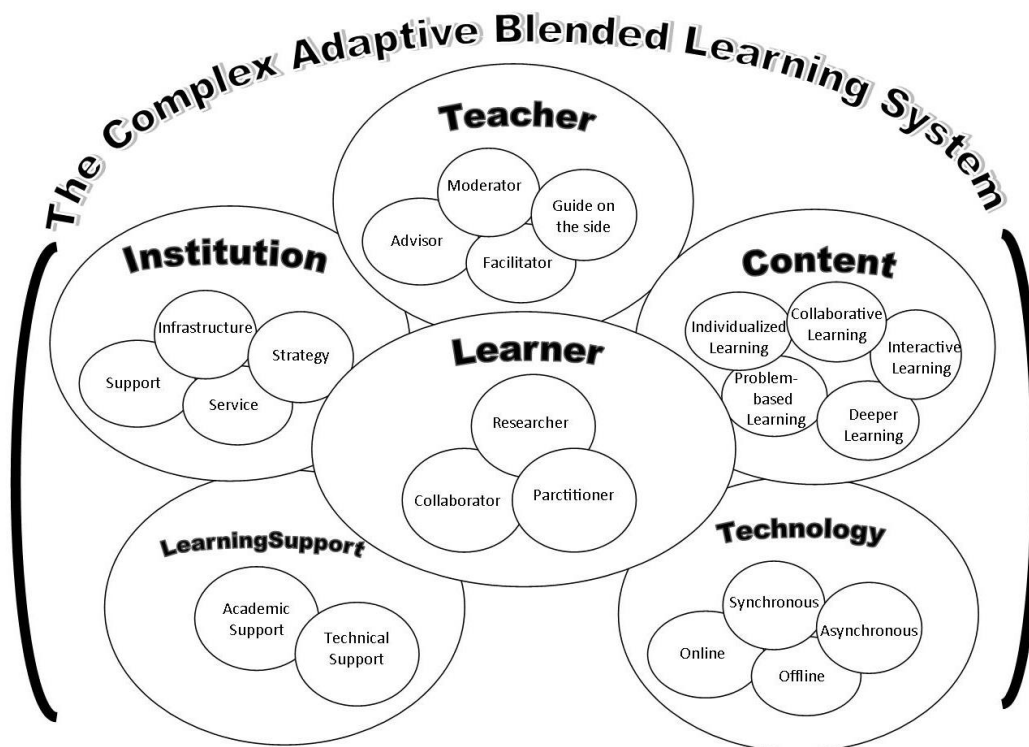
Figure 2 Complex Adaptive Blended Learning Systems (CABLS) Framework
Source: Adaptation of "Revisiting the Blended Learning Literature: Using a Complex Adaptive Systems Framework" by Yuping Wang, Xibin Han and Juan Yang, 2015, p.383.

According to Wang et al. (2015): **Learner in CABLS** refers to a complex subsystem in which learners would be interacting with other subsystems while carrying different roles. The environment of blended learning would switch the roles of learners from passive to actively involve in the learning process. This change is possible because of a dynamic environment and the different interaction ways among the subsystems within the blended learning approach.

Teacher in CABLS would have different roles along with the changes of the roles of learners. The interaction among the subsystems would give a new identity to the teacher either as a facilitator, a counselor, an advisor or an e-moderator.

Content in CABLS would be enriched and more dynamic, not as before. The interaction among the subsystems would foster a learning environment that encourages findings and generation of profound content.

Technology in CABLS with its latest features would aid the interaction among the subsystems. The interaction among technologies and also between technology and the environment would foster a meaningful learning environment.

Learning support in CABLS would focus on two specific learning supports, namely academic support and technical support. Academic support is offered to the learners in order to produce effective learning strategies; while technical support is offered to enhance learners' knowledge on technology while completing their assignments. These supports are channeled according to the specific needs of learners through the expertise of teachers, technology's usability and help from the institution.

Institution in CABLS refers to the roles of institution in offering support as well as policy, strategy and services planning to create a blended learning environment in schools. These roles would expand based on feedbacks received from the other subsystems. In other words, institution is the main subsystem which helps to build up and expand the other subsystems.

Objectives

This study aims to identify the articles related to blended learning from the online journals in the database of Education Resources Information Centre (ERIC). Based on analysis, the researcher intends to: i) identify the gap within the studies on blended learning in the education field; and ii) enhance our knowledge on previous findings as well as the necessary needs that must be achieve within the practices and studies on blended learning. Besides, the analysis on findings also intends to give a thorough overview on studies related to blended learning and its trend within the latest decade. As such, this study serves as a stepping stone to other researchers so as to expand or increase studies which would be exploring the combination of new subsystems concerning issues and theme related to blended learning, particularly in the education system of Malaysia.

Methods

Blended learning is a new issue or a new theme in the education of Malaysia; hence, the scope of this study is conducted within limited available resources. Besides, the content analysis process is also a new method, unlike the usual methods used in the other studies or article writing within the same level. The method used in the content analysis of this study is called the Complex Adaptive Blended learning Systems (CABLS) introduced by Wang et al. (2015). The process of content analysis which involved summarizing and writing the findings began with articles selection from available resources, followed by categorization according to the subsystems and combination of

subsystems. Finally, report writing is based on the research scope according to the format suggested within the content analysis method.

Data accumulation

Literature review is carried out by using the data accumulated online from the Education Resources Information Center (ERIC) database. Scope of data was fixed for the period of January 2015 until July 2016 with specification for articles labeled "peer reviewed only". The search was performed by using "blended learning" as the search keyword with "Instructional Design" as the descriptor. As a result from the search, 42 journal articles are generated and ready to be analysed.

Data analysis

The data is categorized and analysed by using content analysis method. The articles are categorized based on the research's focus into six subsystems within the CABLS, namely learner (L), teacher (T), content (C), technology (Te), learning support (LS), and institution (I).

Findings from literature review towards blended learning

Based on the CABLS framework, this study will describe: 1) Identification of the subsystems and their relationship based on literature review; and 2) Evaluation on the effect of the relationship (the achievements) between the subsystems within the study; and to identify the gap within the practices and studies related to blended learning.

### Identification of subsystems and their relationship

The amount of studies conducted which are related to each of the subsystems must be identified in order to capture the complete overview of the latest trend and development of studies on blended learning since 2015. Figure 3 below shows the amount of studies related to each of the subsystems with a total of 42 articles. Based on literature review, each of those articles is related to more than one subsystem. The most popular with 56.8% (25) studies each, focused on the subsystems of learner and learning support; followed by technology subsystem with 38.6%, content subsystem with 20.5% and institution subsystem with 15.9%. Teacher subsystem was the least focused subsystem with 11.4% (5) studies only.
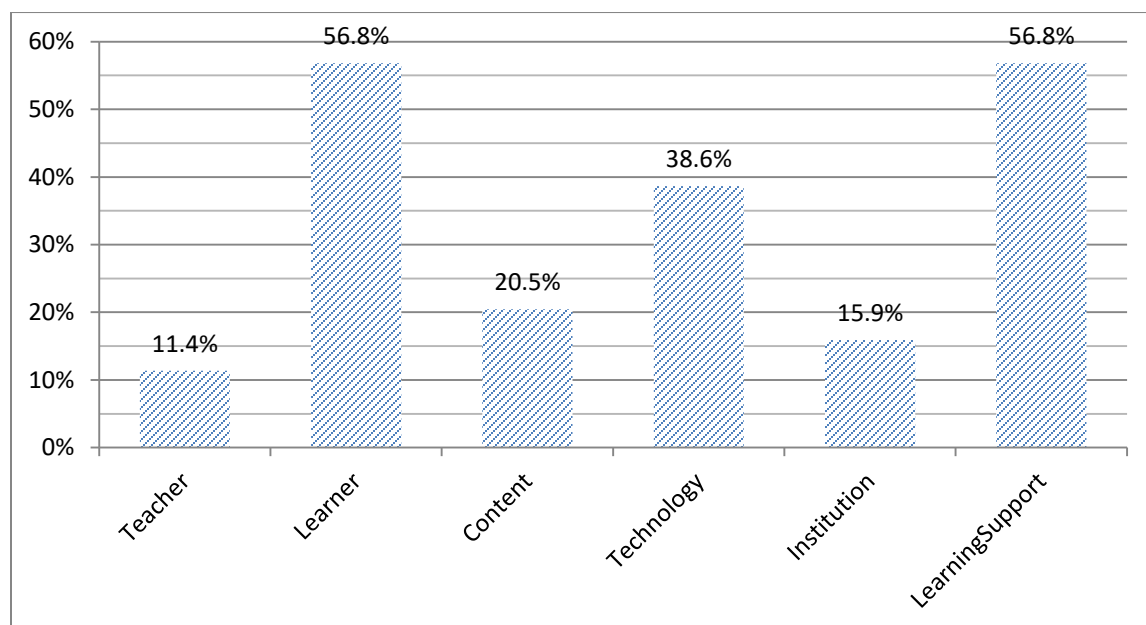
Figure 3 Percentages graphs of the study based on subsystems

The analysis-approach technique in CABLS is used to investigate the relationship between the different subsystems in order to elaborate the findings. Statistically, there are supposed to be 15 one-to-one relationships between these subsystems in this analysis. However, there are only 10 relationships identified (existed) from the 42 articles. Figure 4 below clearly shows the relationships between these subsystems. Based on the graphs in Figure 4, learner – learning support (L-LS) is the most studied subsystems relationship with 27.3% (12) articles from 42 articles; followed by learner – technology (L-Te) subsystems relationship with 22.7% (10) articles; while teacher – technology (T-Te) is the least studied subsystems relationship with only 2.3% (1) article.

Both Figure 3 and Figure 4 indicate that the teacher subsystem and its relationship to the others are the least studied relationship. Moreover, there is no trace of research focusing on the relationships between teacher – learner, teacher – content, learner – institution, content – institution and technology – institution based on literature review. Contrary to that, these relationships are no less important, which could have comprehensively explain and determine the factors of success of the practices of blended learning approach. Furthermore, this analysis has found out that there is not only one-to-one relationship between the subsystems but there are also one-to-various relationships or even various relationships occurred between the subsystems in CABLS which are not analysed or elaborated in this study. The writing of this study is focused on one-to-one relationship between the subsystems because of the scope limit within this study eventhough the other relationships are also important. In conclusion, the findings in Figure 4 are a combination of the findings in Figure 3. The combination of both findings directly indicates the complete overview of the research landscape of current blended learning. As such, as mentioned earlier, the identification of subsystems and their relationships are able to enhance our knowledge on the gap or differences as well as the existed focuses within the studies and practices on blended learning.
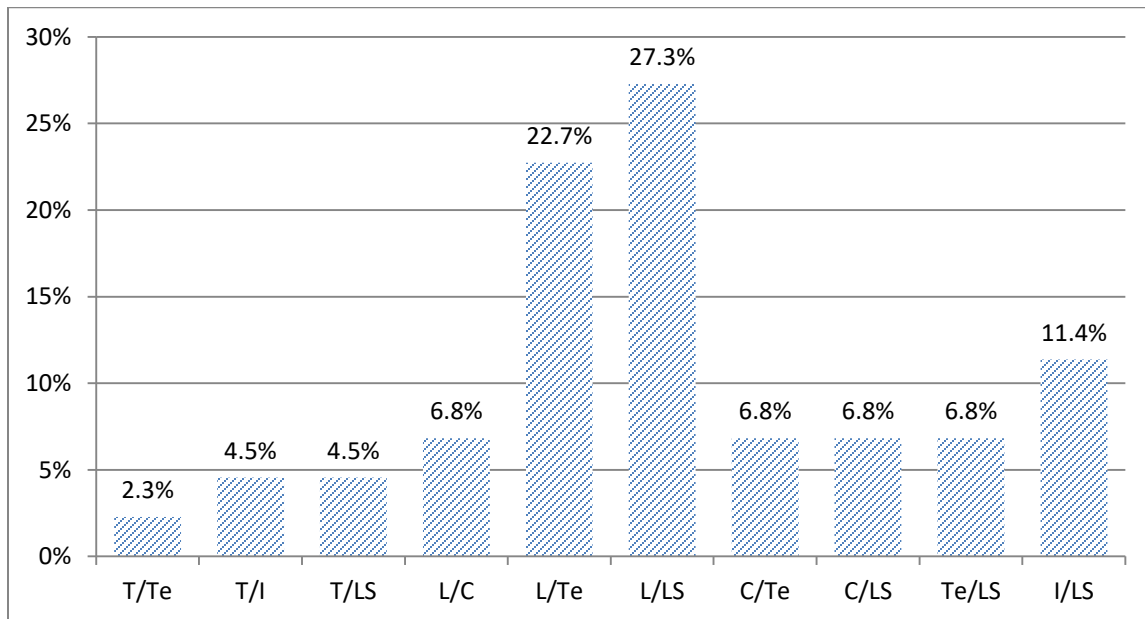
Indicator: T=Teacher; L=Learner; C=Content; Te=Technology; LS=Learning Support; I=Institution

Figure 4 Percentages graphs of study based on relationships between subsystems

In this part, the study would elaborate on the interaction between each subsystem based on literature review. The focus would be the main issue related to each subsystem.

Learner subsystem in blended learning

Based on literature review, most of the previous studies which had focused on the learner subsystem in blended learning mainly involved the combination of learner – content subsystems, learner – technology subsystems, and learner – learning support subsystems (refer Figure 4). Overall, the studies mainly focused on two main issues which involved learning effectiveness, and the perception of learners towards blended learning.

Most findings of the studies discussed on: 1) the effectiveness of blended learning approach towards learners' achievement; 2) Blended learning had contributed to the enhancement of new learning skills among the learners; and 3) positive feedbacks (attitude and characters) of learners towards blended learning approach. Study by Costley and Lange (2016) for example, indicated that learning effectiveness was highly influenced by the satisfaction of learners (learners' need fulfilled). On the other hand, Chen & Yao (2016) agreed that the positive perception of learners towards learning would result in positive impact to the learning outcome. Furthermore, Chan and Leung (2016) stressed that blended learning had improved the learners' involvement in learning activities; hence, indirectly helped them achieved the targeted scores in learning. In other words, most findings of the studies indicated positive feedbacks from learners towards blended learning (Akgunduz & Akinoglu, 2016; Chen & Yao, 2016; Moskal, Thompson, & Futch, 2015; Yapici, 2016).

Teacher subsystem in blended learning

Teacher subsystem is the least studied and discussed subsystem in the context of blended learning (refer Figure 4) with only 11.4%. Besides, the combination of subsystems which involved teacher subsystem, namely teacher – technology subsystems, teacher – institution subsystems and teacher – learning support subsystems are also the least studied (Figure 4). Mirriahi, Alonzo, McIntyre, Kligyte, & Fox (2015) explained that the roles of teachers in the process of learning have changed along with the changes in technology which had also introduced new learning approaches. Moreover, their studies also suggested that institution plays an important role in the development of teachers' competency while discussing the relationship of teacher – institution subsystems relationship.

Content subsystem in blended learning

Based on the overall analysis of this study, studies related to the content subsystem involved the combination of learner – content subsystems, content – technology subsystems, and content – learning support subsystems with the same total of 6.8% each. In general, studies related to content discussed on issues concerning the design of curriculum, its presentation and the effectiveness of interaction between content and learner. Study by Tsurutani & Imura (2015) found out that the design of online assignment for Japanese language have encountered some set-backs which had affected the learning process. Those set-backs were caused by some technical problem within the computer system. Besides, the technical aspect of a computer system could also hinder the creativity of learners in building sentences while acquiring a new language. However, the online design has assisted teachers and save their time in checking the assignments.

Mazur, Brown, and Jacobsen (2015) summarized that blended learning is able to maximize the presentation of learning content and offer a variety of delivery methods. Learners could learn according to their own ability (autonomy), more motivated, while able to improve learning effectiveness (Banditvilai, 2016). The changes in the concept of content delivery of blended learning approach from the concept of traditional delivery to online learning has directly improved the standard and success of learning process; therefore, lead to positive achievement (Banditvilai, 2016; Challob, Nadzrah, & Hafizah, 2016; Yapici, 2016).

Wang et al. (2015) stated that by using this analysis system approach, the transformation of content subsystem can be seen clearly when it interact with learner subsystem, technology subsystem and learning support subsystem. Any flaw in these subsystems relationships would cause the content delivery process to be less effective.

Technology subsystem in blended learning

Literature review indicated that technology subsystem has the most interaction with the other subsystems. Besides, this is also the most important subsystem which has contributed to the success of blended learning approach (Wang et al., 2015). Study by Pima, Odetayo, and Iqbal (2016) explained that: 1) a flexible, durable and user friendly technology system; and 2) excellent infrastructures provided by the technology system are the important factors in the success of blended learning. Based on the relationships between teacher – technology subsystems and learner – technology subsystems, findings indicated that both teacher and learner shared a very positive perception towards technology (Banditvilai, 2016; Campbell, 2015; Chen & Yao, 2016; Hariadi, Dewiyani, & Sudarmaningtyas, 2016). Study by Mills (2015) also found out that teachers have high confidences in the effectiveness of technology in the process of learning.

Institution subsystem in blended learning

Institution subsystem is another least studied component, after teacher subsystem. Besides, the subsystems relationship involving institution such as institution – teacher subsystems and institution – learning support subsystems are also the least studied (only two interactions).

Amrien Hamila and Mohamed Amin (2016) explained that support from institution is essential to teachers in order to ensure the success of blended learning approach. There are plenty of ways in which institutions could support the teachers; amongst them are by offering human resources training, technical support, technology utility equipments, institutionalization of learning and the practices of accurate and suitable curriculum design. Besides, institution is also the main subsystem in determining the direction of the education system. The change of strategy within the education system which is in accordance with the current changes will be a success if every component shares the same objectives and work together (Meier, 2016).

Learning support subsystem in blended learning

Learning support is another essential component in order to ensure success in the process of learning. Based on literature review, learning support subsystem is the most studied subsystem with equal amount of percentages with learner subsystem. Most studies have involved learning support subsystem as the main issue in the effort to identify the best practices for blended learning approach. Amongst them are study by Arwa Ahmed and Gandla (2016) which explained the roles of learning support to the teachers in order to ensure success in the process of learning by using the blended learning approach. Nanclares and Rodríguez (2016) also explained that the need to master the skills and usage of technology utility would help learners to achieve their learning objectives. Furthermore, Heckman, Østerlund, and Saltz (2015) and Carré (2015) also agreed that institution plays important roles in preparing the exact learning support to teachers and learners in order to ensure success in the institutionalization of blended learning.

Wang et al. (2015) explained that learning support must be improve based on the needs of learners, according to the skills of teachers, and in accordance with the advancement of technology while getting full support from institution to ensure its success. The firm relationships among the subsystems which involved the learning support subsystem would determine the accomplishment of blended learning.

Conclusion

In order to describe the concept of blended learning approach, Wang et al. (2015) explained blended learning approach as: 1) complex – involving lots of learning components to ensure the success of blended Learning approach; 2) adaptive – flexible adjustment in which blended learning is an easily modified approach in order to fulfil the needs of current learning (aspects of content, learner, teacher, and instructional strategy); 3) dynamic – an approach which is able to change in accordance with the advancement of technology and current learning issues; 4) "self-organizing" – a structurable approach to suit its interaction relationship with the other learning components; and v) "co-evolving" – an approach which could develop in accordance with the development of new learning characteristics, current technology, latest skills based on the teachers' background and improvement of learning objectives.

Based on the framework of CABLS, literature review of this study has identified some gaps within the studies and practices of current blended learning approach. Firstly, literature review has found out that no study has ever discussed the issue of blended learning which involved all six subsystems together. Secondly, the framework of CABLS has identified several subsystems and the relationship between some subsystems which needed attention in future studies. Amongst them are subsystems related to teacher – technology, and the interaction between institutions with other institutions, and between subsystems with the other subsystems. Thirdly, the research has found no study on issues related to the relationships between teacher – learner subsystems, teacher – content subsystems, learner – institution subsystems, content – institution subsystems, and technology – institution subsystems whereby these relationships are of no less importance and must be explored in order to find out the effect of their interactions. Fourthly, the analysis occupying the framework of CABLS has revealed the future possible research regarding blended learning to the public, such as a study on the effect of interaction of the relationships between one-to-various subsystems and the relationships between various subsystems. These possibilities would make ways for future researchers to explore new issues concerning the related subsystems.

In conclusion, it is our hope that this study has enhanced the overall knowledge accurately on the features, characteristics and quality of the practices of current blended learning; while revealing the gaps which must be fulfil within the practices and studies of blended learning approach in the future. Finally, based on the trend and development of such dynamic instructional design, complete preparation is essential in order to handle future challenges to fulfil the needs of 21st century learning.

References

Abdul Latif, G., & Lajiman, J. (2011). A study of student ' s perception of teaching and learning in instructional design and technology faculty of languages and communication. *International Journal of Humanities and Social Science*, *1*(15), 80–86.

Akgunduz, D., & Akinoglu, O. (2016). The effect of blended learning and social media-supported learning on the students' attitude and self-directed learning skills in science education. *Turkish Online Journal of Educational Technology*, *15*(2), 106–115. Retrieved from http://www.scopus.com/inward/record.url?eid=2-s2.0-84962433283&partnerID=tZOtx3y1

Almasaeid, T. F. (2014). The effect of using blended learning strategy on achievement and 9th grade students. *European Scientific Journal*, *10*(31), 133–145. Retrieved from http://eujournal.org/index.php/esj/article/viewFile/4573/4370

Alwehaibi, H. O. (2015). The impact of using youtube in EFL classroom on enhancing EFL students' content learning. *Journal of College Teaching & Learning*, *12*(2), 121–126.

Amrien Hamila, M., & Mohamed Amin, E. (2016). Implementation of blended learning in higher learning institutions: A review of literature. *International Education Studies*, *9*(3), 41. http://doi.org/10.5539/ies.v9n3p41

Arwa Ahmed, A. Q., & Gandla, V. (2016). Blended learning approach to develop the teachers ' TPACK. *Contemporary Educational Technology*, *7*(3), 264–276. Retrieved from http://www.cedtech.net/articles/73/735.pdf

Banditvilai, C. (2016). Enhancing students ' language skills through Blended Learning. *The Electronic Journal of E-Learning*, *14*(3), 220–229. Retrieved from http://files.eric.ed.gov/fulltext/EJ1107134.pdf

Bitner, N., & Bitner, J. O. E. (2002). Integrating technology into the classroom: Eight keys to success. *Journal of Technology and Teacher Education*, *10*(1), 95–100.

Briggs, K. C. (2014). *Blended learning vs face-to-face instruction: a quantitative evaluation of student achievement in algebra I*. Northcentral University.

Campbell, K. (2015). Design thinking and the deanly conversation : reflections on conversation , community , and agency. *Journal of Learning Design*, *1*(3). Retrieved from https://www.jld.edu.au/article/view/253/225

Carré, C. (2015). The challenge of designing blended courses: from structured design to creative faculty support! *Canadian Journal of Learning & Technology*, *41*(3), 1–29. Retrieved from http://connection.ebscohost.com/c/articles/110911937

Challob, A. I., Nadzrah, A. B., & Hafizah, L. (2016). The influence of blended learning on EFL students' writing apprehension and writing performance: a qualitative case study. *European Journal of Multidiscipliary Studies*, *1*(1), 229–241. http://doi.org/10.5539/elt.v9n6p229

Chan, S. (2001). Complex adaptive systems. In *ESD.83 Research Seminar in Engineering Systems* (pp. 1–9). http://doi.org/10.1002/cplx.20316

Chan, W. T. Y., & Leung, C. H. (2016). The use of social media for blended learning in tertiary education. *Universal Journal of Educational Research*, *4*(4), 771–778. http://doi.org/10.13189/ujer.2016.040414

Chen, W. S., & Yao, A. Y. T. (2016). An empirical evaluation of critical factors influencing learner satisfaction in blended learning: a pilot study. *Universal Journal of Educational Research*, *4*(7), 1667–1671. http://doi.org/10.13189/ujer.2016.040719

Cleveland, J. (1994). *Complexity theory: basic concepts and application to systems thinking*. Retrieved from http://www.slideshare.net/johncleveland/complexity-theory-basic-concepts

Costley, J., & Lange, C. (2016). The effects of instructor control of online learning environments on satisfaction and perceived learning. *The Electronic Journal of E-Learning*, *14*(3), 169–180. Retrieved from http://files.eric.ed.gov/fulltext/EJ1107123.pdf

Graham, C. R. (2006). Blended learning systems: definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *The Handbook of blended learning: Global Perspectives, local designs.* (pp. A1–A88). San Francisco, CA: Pfeiffer Publishing. http://doi.org/10.2307/4022859

Hariadi, B., Dewiyani, M. J. S., & Sudarmaningtyas, P. (2016). Development of web-based learning application for generation Z. *International Journal of Evaluation and Research in Education (IJERE)*, *5*(1), 60–68. Retrieved from http://files.eric.ed.gov/fulltext/EJ1094663.pdf

Heckman, R., Østerlund, C. S., & Saltz, J. (2015). Blended learning at the boundary: Designing a new internship. *Journal of Asynchronous Learning Network*, *19*(3), 111–127. Retrieved from http://files.eric.ed.gov/fulltext/EJ1067509.pdf

Kern, T., & Rubin, A. (2012). *Designing the future of learning*. 2Revolution. Retrieved from http://www.2revolutions.net/2Rev_Designing_the_Future_of_Learning.pdf

Kong, S. C., Chan, T.-W., Griffin, P., Hoppe, U., Huang, R., Kinshuk, … Yu, S. (2014). E-learning in school education in the coming 10 years for developing 21st century skills: critical research issues and policy implications. *Education Technology & Society*, *17*(1), 70–78. Retrieved from http://chan.lst.ncu.edu.tw/publications/2014-E-learning in school education.pdf

Korkmaz, O., & Karakus, U. (2009). The impact of blended learning model on student attitudes towards

geography course and their critical thinking dispositions and levels. *The Turkish Online Journal of Distance Education*, *8*(4), 51–63. Retrieved from http://files.eric.ed.gov/fulltext/EJ859497.pdf

Mazur, A. D., Brown, B., & Jacobsen, M. (2015). Learning designs using flipped classroom instruction. *Canadian Journal of Learning and Technology*, *41*(2), 1–26. Retrieved from http://search.proquest.com/docview/1720057846?accountid=8194

Meier, D. (2016). Situational leadership theory as a foundation for a blended learning framework. *Journal of Education and Practice*, *7*(10), 25–30. Retrieved from http://www.iiste.org/Journals/index.php/JEP/article/view/29818

Mills, J. (2015). A conceptual framework for teaching statistics from a distance. *Journal of Effective Teaching*, *15*(1), 59–68. Retrieved from http://files.eric.ed.gov/fulltext/EJ1060441.pdf

Mirriahi, N., Alonzo, D., McIntyre, S., Kligyte, G., & Fox, B. (2015). Blended learning innovations: leadership and change in one Australian institution. *International Journal of Education and Development Using Information and Communication Technology*, *11*(1), 4–16. Retrieved from http://files.eric.ed.gov/fulltext/EJ1061471.pdf

Mohamed Amin, E., Norazah, M. N., & Ebrahim, P. (2014). Overview of blended learning. In E. Mohamed Amin (Ed.), *Blended & Flipped Learning : Case Studies in Malaysian HEIs* (p. 1). Centre for Teaching & Learning Technologies, Universiti Kebangsaan Malaysia & Department of Higher Education, Ministry of Education Malaysia. Retrieved from http://www.moe.gov.my/cms/upload_files/publicationfile/2015/pubfile_file_002071.pdf

Mohd Azli, Y., Wong, K., & Noraini, M. N. (2016). Pembelajaran teradun: satu tinjauan literatur terhadap faktor- faktor penerimaan guru melalui model-model penerimaan. *Journal of Research, Policy & Practice of Teachers & Teacher Education*, *6*(1), 67–85. Retrieved from http://ejournal.upsi.edu.my/article/2016AR001111

Moskal, P., Thompson, K., & Futch, L. (2015). Enrollment, engagement, and satisfaction in the blendkit faculty development open, online course. *Journal of Asynchronous Learning Network*, *19*(4). Retrieved from http://files.eric.ed.gov/fulltext/EJ1079573.pdf

Nanclares, N. H., & Rodríguez, M. P. (2016). Students ' satisfaction with a blended instructional design: the potential of " flipped classroom " in higher education. *Journal of Interactive Media in Education*, *1*(4), 1–12. http://doi.org/dx.doi.org/10.5334/jime.397

Nguyen, T. N. (2015). Motivational effect of web-based simulation game in teaching operations management. *Journal of Education and Training Studies*, *3*(2), 9–15. http://doi.org/10.11114/jets.v3i2.565

Pima, J. M., Odetayo, M., & Iqbal, R. (2016). Assessing the available ICT infrastructure for collaborative web technologies in a blended learning environment in Tanzania: a mixed methods research, *12*(1), 37–52. Retrieved from http://files.eric.ed.gov/fulltext/EJ1099579.pdf

Simelane, S., & Mji, A. (2014). Impact of technology-engagement teaching strategy with the aid of clickers on student ' s learning style. *Procedia - Social and Behavioral Sciences*, *136*, 511–521. http://doi.org/10.1016/j.sbspro.2014.05.367

Singh, H. (2003). Building effective blended learning programs. *Educational Technology*, *43*(6), 51–54. http://doi.org/10.1021/es2033229

Tsurutani, C., & Imura, T. (2015). Designing online assignments for Japanese language teaching. *The JALT CALL Journal*, *11*(3), 255–270. Retrieved from http://journal.jaltcall.org/articles/11_3_Tsurutani.pdf

VanDerLinden, K. (2014). Blended learning as transformational institutional learning. In *New Directions for Higher Education* (pp. 75–85). http://doi.org/10.1002/he

Wang, Y., Han, X., & Yang, J. (2015). Revisiting the blended learning literature: using a Complex Adaptive Systems Framework. *Educational Technology & Society*, *18*(2), 380–393.

Wong, L., Tatnall, A., & Burgess, S. (2014). A framework for investigating blended learning effectiveness. *Education + Training*, *56*(2), 233–251. http://doi.org/10.1108/ET-04-2013-0049

Yapici, İ. Ü. (2016). Effectiveness of blended cooperative learning environment in biology teaching: classroom community sense, academic achievement and satisfaction. *Journal of Education and Training Studies*, *4*(4), 269–280. http://doi.org/10.11114/jets.v4i4.1372

Yapici, İ. Ü., & Akbayin, H. (2012). The effect of blended learning model on high school students' biology achievement and on their attitudes towards the internet. *The Turkish Online Journal of Educational Technology*, *11*(2), 228–237. Retrieved from http://files.eric.ed.gov/fulltext/EJ989031.pdf

Zaharah, H., Saedah, S., Ghazali, D., & Nur Hasbuna, M. S. (2015). Kajian model blended learning dalam jurnal terpilih: satu analisa kandungan. *Jurnal Kurikulum & Pengajaran Asia Pasifik*, *3*(1), 20–31. Retrieved from http://repository.um.edu.my/98074/1/Artikel_4_Bil_3_Isu_1.pdf

About the authors

Mohd Azli, Yeop, Master in Instructional Design and Technology Education. Currently, he is a Doctor of Philosophy (Instructional Technology Education) candidate in Faculty of Education and Human Development, Sultan Idris Education University (UPSI), Perak, Malaysia. His research is related to the Blended Learning acceptance in Education. Mohd Azli is interested in teaching strategies (Strategies in instructional technologies).

Email: azliyeop@gmail.com

Kung-Teck, Wong is a Associate Prof. at Faculty of Education and Human Development, Sultan Idris Education University (UPSI), Malaysia. Prior to joining UPSI, he was a senior teacher in government schools. He completed his Ph.D. from University Malaysia Sabah and Post-Doctoral at University of South Australia, Australia (UniSA). He has published extensively in local and international journals. He also serves as reviewer of several local, ISI, and SCOPUS indexed journals. In the past five years he has secured many public and private research funding. Wong is interested in statistic studies and also the application of SPSS and AMOS -structural equation modelling in his writing articles and research.

Email: thomas@fppm.upsi.edu.my

Noraini, Mohamed Noh is a senior lecturer at Faculty of Education and Human Development, Sultan Idris Education University (UPSI), Perak, Malaysia. She holds a doctorate degree from Universiti Kebangsaan Malaysia majoring in resource and information technology. Her research interest are school library media centre, technology adoption, dan learning environment.

Email: noraini.mn@fppm.upsi.edu.my