Research Article doi: 10.12973/ijem.7.1.1

International Journal of Educational Methodology
Volume 7, Issue 1, 1 - 13.
ISSN: 2469-9632
http://www.ijem.com/

Contextualizing the Global Standards for Designing Online Courses: A Design-Based Research Approach for Developing Small Private Open Courses

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Received: June 15, 2020 ▪ Revised: October 10, 2020 ▪ Accepted: December 26, 2020

Abstract: E-learning has become a viable mean to both Massive Open Online Courses (MOOCs), and Small Private Open Courses (SPOCs). Research has shown that the quality and effectiveness of these types of courses depend largely on the contextual factors that may impact the design and development of online courses. This study highlights a design framework for a SPOC offered at Sultan Qaboos University. It employs a design-based research methodology, which is a systematic research approach aimed to improve instructional practices through iterative analysis, design, development, and implementation to produce contextually-sensitive design principles. The sample of this study consists of a diverse group of subjects including instructional designers, subject-matter experts, as well as students. The findings illustrate the importance of contextual logistics that need to be considered in the design and development of SPOCs. The findings also highlight the importance of the DBR as a suitable research methodology for similar developmental studies.

Keywords: *Design-based research methodology, design principles, SPOC, MOOC, online courses.*

To cite this article: Al-Aghbari, M. S., Osman, M. E., & Al Musawi, A. S. (2021). Contextualizing the global standards for designing online courses: A design-based research approach for developing small private open courses. *International Journal of Educational Methodology*, *7*(1), 1-13. https://doi.org/10.12973/ijem.7.1.1

Introduction

With the spread of e-learning, the term Massive Open Online Courses (MOOCs), began to appear in 2007, and has been used to describe a free Internet-based sharing platform that are accessible from any place and at any time, disseminating free curriculum resources at a wider range (Annabi & Wilkins, 2016). MOOCs are online courses accessible to people around the world. Many universities have started adapting and offering this type of courses. They are originally aimed to offer free access to educational content from universities worldwide. For instance, Abed (2020) investigated the use of MOOCs among faculty members in the University of Jordan. MOOCs have since then witnessed changes and developments in the way they are designed, delivered and evaluated (Annabi & Wilkins, 2016). Moreover, new technologies and methods, including information and communication technologies, have been integrated into MOOCs (Elkins & Pinder, 2015).

Alario-Hoyos et al. (2014) proposed a conceptual framework called the MOOCs Canvas to help educators describe and design MOOCs. The idea of MOOCs Canvas was derived from the Business Model Canvas initiated by Osterwalder and Pigneur (2010). MOOCs Canvas is based on eleven logistical, technological, pedagogical, and financial factors to be considered when designing MOOCs. Six educators participated in designing MOOCs Canvas. Through feedback and discussion, they were able to define these factors, which are classified into available resources and design decisions. Available resources are the main resources available to the instructors when designing MOOCs, including human resources, intellectual resources, equipment (hardware and software resources), financial resources, and the platform where the MOOCs will be implemented. The design decisions classification provides a general description of the course (i.e., name, duration, and area), the target learners, the instructional approaches used, the objectives and competencies to be achieved, the content of the course that will be delivered to learners, the implemented assessment activities, and the corresponding technologies to support the MOOCs. Each issue is analyzed by a set of questions to guide instructors in designing the MOOCs.

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Higher education institutions (HEIs) use MOOCs to support the university e-learning delivery. However, research shows that designing and developing Small Private Online Courses (SPOCs) within an institution differs from other forms of online courses such as MOOC in terms of users and resources, as both should be carefully specified in the design stage (Fox, 2017; Al Shihi et al., 2015). Hence, some researchers have started to widely investigate the effectiveness of using these SPOCs on students' performance and achievements. Other researchers have attempted to analyze various learning management systems and their characteristics, and investigated their contributions to educational systems (Fox et al., 2014). The following section is a review of SPOCs design principles.

Literature Review

SPOCs Universal design principles

The design guidelines for SPOCs at HEIs are important for several crucial reasons. First, they provide a description of what has been accomplished and what needs to be done. Second, they enhance the effectiveness of the current online courses. Third, they guide educators, instructional design specialists, experts, and decision makers to design and develop standardized online courses. Forth, they facilitate the evaluation process and quality assurance (QA) of online courses. Finally, they help decision-makers to identify areas where support is needed (Endean et al., 2010).

Well-designed SPOCs can provide a variety of features conducive to learning. A very important feature is the quality of online course content and the best practices of quality assurance standards. Kulshrestha and Sharma (2017) point out that quality is one of the key characteristics of a successful on-campus online course. Khan (2005) writes that identifying critical issues is believed to improve the quality and effectiveness of the e-learning characteristics within the different categories of open, flexible, and distributed learning environments. Ally (2011) further emphasizes that, in order to promote quality learning and consistency between individual needs and instructions, appropriate learning principles need to be adapted as well. McGahan et al. (2015) confirm that quality assurance, if used, can help build confidence throughout the process, and assure that the basic factors for online course success are included in the course structure. Vai and Sosulski (2011) highlight that there is a need to develop a well-established design framework (guidelines) to assess and assure the quality level of current practices. Moreover, Ally (2011) indicates that designing a framework with reliable standards helps to block existing issues.

Several HEIs have started establishing standards for designing, delivering, and evaluating their online courses (McGahan et al., 2015). There are already several quality evaluation instruments designed by some institutions that evaluators can adopt. The best of these include the Maryland Online Quality Matters rubric, the Illinois Online Network's Quality Online Course Initiative rubric (QOCI), and California State University's Chico's Rubric for Online Instruction (ROI). Some institutions have created their own standards depending on their specific needs; and therefore, have designed their own evaluation instruments (McGahan, et al., 2015).

Five of the best universal design principles for online course design and development will be discussed in this paper; namely the California State University Rubric for Online Instruction, the Online Course Best Practices Checklist of Palomar College, the QOCI rubric from the University of Illinois, the Online Education Initiative by California Community Colleges, and the edX MOOC Development Checklist. The researchers in this study constructed the first adopted design principles draft after reviewing these five models and initiatives.

It is argued that the quality standards of e-learning should collaboratively include instructors, students, and administrators. There must be certain guidelines for designing and developing online instruction (Bigirwa et al., 2020); that is, online instruction has to follow certain criteria and standards. Many HEIs have established and adapted their own criteria for designing and developing online courses. Looking at the best practices of online course design and development worldwide, it is noticed that highly qualified online courses consider various categories. For instance, California State University (in Chico) Rubric for Online Instruction (ROI) includes six main domains: learner support and resources, online organization and design, instructional design and delivery, assessment and evaluation of student learning, innovative teaching with technology, and faculty use of student feedback (California State University, Chico, 2020).

In addition to the ROI of California State University, there is the Online Course Best Practices Checklist of Palomar College. It also has six major categories including course information, course design and organization, aesthetic design, interaction and collaboration, effective use of technology, and assessment or evaluation. Each one of these six categories includes elements that are considered the set of well-defined standards of a desirable online course (Baldwin & Trespalacios, 2017).

Added to the Checklist of Palomar College, there is the QOCI rubric from the University of Illinois. The rubric consists of four elements, namely: instructional design; communication, interaction and collaboration; student evaluation and assessment; and accreditation compliance (Illinois Online Network, 2008).

Finally, there is the Online Education Initiative by California Community Colleges. It was designed in 2014 and includes five important elements: content presentation, interaction, assessment, accessibility, and institutional accessibility concerns (The Online Education Initiative Steering Committee, 2016).

It is obvious from the above-mentioned best practices of online course design and development that the criteria of online courses are categorized under four main fairly similar categories: instructional design, interaction and communication, evaluation and assessment, and accessibility and technical support. On the other hand, there are some fairly similar sub-categories such as: learner support, resources, students' feedback, and course information. The quality of online courses can be increased by following these criteria.

It appears that there is not a unified set of standards around the world used for e-learning or online courses (Al Musawi, 2010; Sederberg, 2003). The best universal practices, standards and rubrics are used as key elements to measure the quality of online courses. Since they are recognized as the best practices, they are also referred to when contextualizing the standards. Therefore, this study adapted and employed the standards of two of the best universal practices; the Illinois Online Network's (ION) Quality Online Course Initiative rubric (QOCI), and California State University's Chico's Rubric for Online Instruction (ROI) to design and develop on-campus online courses (SPOCs) at Sultan Qaboos University (SQU), the case under investigation. In the following section, we will present and discuss issues related to the study context, with a focus on these two models.

QOCI and ROI design principles

The reviewed literature of these two models shows common categories. The researchers adopted the whole ROI set of principles along with another three from the QOCI to come up with the first draft of the SPOCs design principles that included eight elements, which are learning management system, content, multimedia, structure, interactivity, navigation and screen design, technical support, and reporting and record keeping. These eight design principles are presented in Figure 1, explained and discussed below. They were used as the first drafted list of SPOCs design principles in the fieldwork.

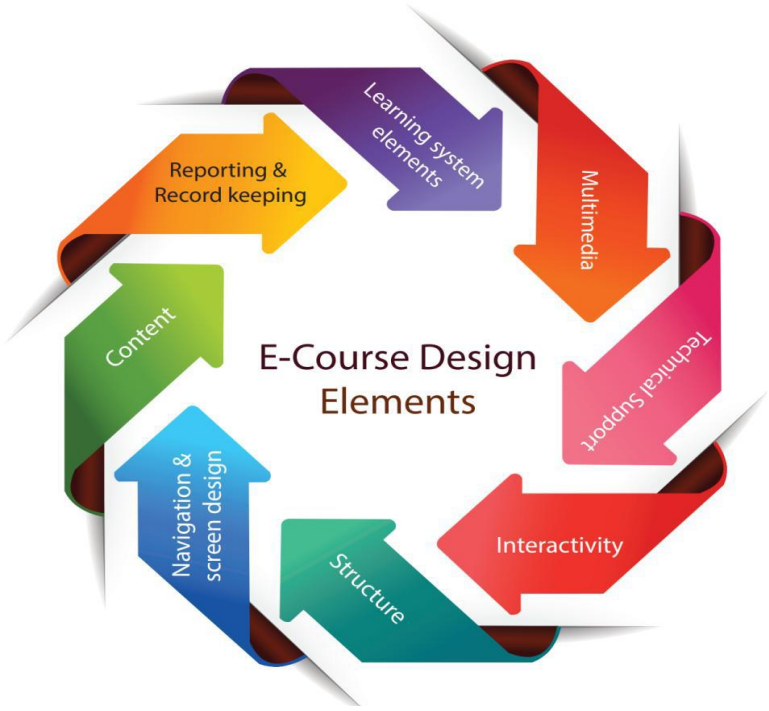

Figure. 1: E-course design elements.

1. Learning management system. When an online course is designed and developed, it needs to be placed on a platform where students can easily access it. This is what is called a Learning Management System (LMS) such as Blackboard and Moodle.

2. Content. The quality of content and instruction is important to ensure that interaction occurs. Thus, online course authors (i.e., designers, developers and SMEs) have to define the objectives of the course and the learning outcomes for students (Martin et al., 2012). That is, the course content should match the learning outcomes and lead students to meaningful engagement. According to the standards of the R-IV Public Health Training Center (Alperin et al., 2017), competencies and/or learning objectives are (i) designed to measure observable changes in learners' knowledge and/or skills, (ii) aligned with the current skill/knowledge level and needs of the learner, (iii) clearly communicated to the learner, and (iv) supported by the instructional materials, methods and activities.

3. Multimedia. The content is reinforced by integrating multimedia that has a variety of interactive texts, audios, graphs and videos that create student self-paced learning. The standards of the R-IV Public Health Training Center (Alperin et al., 2017) stress that online course material and design accommodates different learning styles. Therefore, the use of a

wide range of multimedia can provide support for both the content and achievement of the learning objectives as well as meeting the different learning styles.

4. Structure. The structure of the designed course content in online courses is an important design element. It is highly advised that the structure of the materials on the online course is organized and designed in a way that facilitates learning (Martin et al., 2012). For example, a course guide and syllabus need to be available to help students understand the requirements of the course. Alperin et al. (2017) called for a standardized course overview that includes: (i) the structure of the course; for instance, modality, format, length and number of modules, and technical requirements; and (ii) the purpose of the course; for instance, overview of content, target audience, learning objectives, and competencies addressed.

5. Interactivity. Learner engagement and interaction is another element to consider in online course design and development. Martin et al. (2012) assert that four types of interaction characteristics should be considered: student-content, student-instructor, student-student and student-interface characteristics. It should support the active participation of learners in the learning process instead of being only passive recipients of knowledge. Active and interactive learning provides students with feedback on their overall progress to ensure interaction between the learners and the content of the course. Alperin et al. (2017) stressed that a standardized instruction aided with learning activities can provide students with opportunities to interact with the content, instructor, and/or other learners.

6. Navigation and screen design. It is important that learners find all online course materials straightforward. That is, the interface of the online course must be easy to navigate. According to the standards of the R-IV Public Health Training Center (Alperin et al., 2017, p. 42S), course technologies have to be "user-friendly and promote learner engagement [and encourage] a positive learning experience".

7. Technical support. Plank et al. (2014) asserted that the mode in which the course materials are offered has to correspond to the technical capabilities of learners. This emphasizes the importance of technical support as a standard for the quality of online course design and development. Additionally, online course designers and developers have to make sure that all links in the course work properly and all necessary applications run without any technical faults. In order to enhance the end-user's experience, Alperin et al. (2017) advised that the course design should include clear instructions for getting technical support.

8. Reporting and record keeping. Finally, it is important to inform the learners about grades and credits, and provide systematic feedback about their overall progress. In other words, it is crucial that the online course gives feedback and keeps a record of student achievements. According to the standards of the R-IV Public Health Training Center (as cited in Alperin et al., 2017), the online course information should clearly describe how learners successfully complete the course, and how they are recognized for successfully completing it, for example receiving a certificate. Added to that, course assessments measure the achievement of each competency/learning objective and collect learner feedback about the online course.

The Omani and SQU contexts

Taking into consideration the rapidly increasing number of students enrolled at Omani HEIs , these institutions need to look at new options to find additional resources and facilities that meet the future social demand to access higher education (Al Musawi, 2010). As a response to this demand, most of these HEIs have started to provide their students with online courses in a blended format, and use online platforms/tools to support their face-to-face learning because of the digital transformation and technological advances in teaching and learning (Osman, 2020; Osman & Abdelraheem, 2003). Such provision can be seen at SQU, University of Technology and Applied Sciences, Arab Open University, and Middle East College with specialized centers responsible for online delivery administration (Al Musawi & Abdelraheem, 2004; Al Shihi et al., 2015).

Sultan Qaboos University, seeking to provide excellence in teaching and learning as part of its vision and mission to serve the Omani society, has been striving to develop its e-learning system throughout the past few years and its quality is essential for successful e-learning. The University Centre for Educational Technology (CET) started to conduct a professional development program to prepare faculty to design and use online courses and, therefore, maintain teaching and learning excellence. In addition, e-learning has become an essential part of the SQU strategic plan where an ad hoc committee was formed to outline this plan incorporating the basis and standards to develop and design online courses (SQU, 2018). Therefore, it is expected that the design process of online courses at SQU is required to meet specific theoretical and practical techniques, methods, and standards. This is important because online courses should be consistent, in terms of their quality and delivery, with face-to-face courses, and this implies designing them based on certain learning principles and theories (Al-Kindi et al., 2017; Al Shihi, et al., 2015).

Omani literature shows the need to consider QA standards for evaluating the on-campus online courses in order to determine their relevance, fulfilment of objectives, effectiveness, and sustainability at Omani HEIs as they only comprise educational information (e.g., articles, videos, images, web links, etc.); communication (e.g., messaging, discussion forums, etc.); and several ways to measure student achievement (Al Musawi, 2010; Gormley, 2014). Most of

these online courses issues include grading and assessment where students can only download subject materials that lack the minimal design attributes such as interactivity, immersiveness and/or engagement (Osman, 2020; Sederberg, 2003). Further, Balaji et al. (2015) state that there is no policy decision about the use of open online courses platforms as part of the formal education structure of Omani HEIs. Interestingly, most of the reviewed Omani studies that were conducted to assess online courses were either descriptive or quiz-experimental in nature. No single study was conducted to document the design processes.

Apparently, the previous experience of the Omani HEIs in general, and SQU in particular in relation to online learning was merely content based courses transferred online. Although most HEIs have started to provide their students with online courses, it was observed that they lack a well-defined contextual framework for designing and developing these courses (Al Musawi, 2010; Al Shihi et al., 2015; Al-Kindi et al., 2017). This study suggests that providing SPOCs as a mean of on-campus student learning combined with such a framework can be an attractive solution to make on-campus online courses open, flexible and easy to access (Liu, 2016), and to follow specific standards and principles of online course design (particularly, QOCI and ROI). Therefore, the need arises to investigate the best design framework that suits Omani HEIs and helps them to build high quality SPOCs for their on-campus students.

Methodology

Research Goal

This study, using design-based approach, proposes a design framework for a Small Private Online Course (SPOC) for the on-campus students at Omani HEIs. In particular, it explores the development and effectiveness of adaptive SPOC guiding design principles for online courses at SQU. More specifically, this study attempts to answer the following questions:

1. What is the status of SPOCs design at Omani HEIs?

2. How effective is the new designed (study skills) SPOC at SQU?

3. What is the best contextual design framework of SPOCs that fits Omani HEI environments?

The researchers perceived that Reeves Model can be used in the construction and development of the design principles of SPOCs (Plomp, 2007). Therefore, a proposed framework was designed and implemented based on the stages and outcomes of Reeves' (2006) DBR Model; with the aim to design, develop, and conduct the fieldwork intervention using on-campus study skills as a sample of a small private online course. The framework comprises the following mixed-method four stages: the analysis stage of practical problems, the development stage of solutions informed by existing design principles and technological innovations, the stage of iterative cycles of testing and refinement of solutions in practice, and the reflection stage to produce design principles and enhance solution implementation. The fieldwork intervention process aimed ultimately to isolate the design principles of SPOCs and enhance the final solution. In order to fulfill the research Questions, ADDIE model (Analysis, design, development, implementation and evaluation) was adopted to design and develop the SPOCs course incongruence with the proposed design principles.

Sample and Data Collection

This study involves mainly Sultan Qaboos University as a sample of the Omani HEIs. In this study, qualitative data was collected from interviews, structured literature review, and Course Evaluation Sheet using purposive sampling. See Table (1)

Table 1: Sample and Data Collection

DBR Phase	Research Question	Sample	Data Collection Tool	ADDIE Model Phase	Validity & Reliability Method	The Outcomes
DBR Phase 1: Analysis of practical problems	What is the status of SPOCs design at Omani HEIs?	(19) policy makers from Sultan Qaboos University	Interview (1)	**A:** **A**nalysis Phase		1-E-learning at SQU. 2-SQU readiness for online courses. 3-SQU policies and regulations for online courses

Table 1: Continued

DBR Phase	Research Question	Sample	Data Collection Tool	ADDIE Model Phase	Validity & Reliability Method	The Outcomes
DBR Phase 2: Development of Solution	2. How effective is the new designed (study skills) SPOC at SQU?	(6) E-learning Experts (2) SMEs (5) IDs	Literature Review Interview (2)	**D:** **D**esign Phase **D:** **D**evelopment Phase		Initial Design Principles
DBR Phase 3: Iterative cycles of testing		(6) E-learning Experts (2) SMEs (5) IDs (30) Students		**I:** **I**mplementation Phase		Study Skills Course blueprint and Prototype
DBR Phase 4: Reflection to enhance solution	3. What is the best contextual design framework of SPOCs that fits Omani HEI	(6) E-learning Experts (2) SMEs (5) IDs (30) Students	Interview (3) Course Evaluation Sheet	**E:** **E**valuation Phase		Final list of SPOCs design principles

The sample of this research study consisted of 62 participants: (19) policy makers from Sultan Qaboos University, (6) E-learning Experts, (2) Subject Matter Experts (SMEs), (5) IDs, and (30) Students. *First,* a group of (19) policy makers including the vice chancellor, the director of CET, the director of the National Center for Open Resource, college deans (n=4), assistant deans (n= 8), the assistant dean of Student Affairs Deanship, the head of the Information Studies Department in the College of Arts and Social Sciences, the head of research and development at CET and faculty members from the Information Systems Department at the College of Economic and Political Sciences was selected. This sample was selected due to the individuals' role in the university power structure and their experience that could inform the research process. *Second,* a group of instructional designers and developers of CET (5), e-learning experts (6), and SMEs (2) was also selected. This sample was selected due to the individuals' role in the university online course design, development, delivery, assessment, and management. *Finally,* (30) students enrolled in the new designed online study skills course as a (SPOC), offered during Fall 2018.

- The tools of the study consisted of three main interviews, structured literature review, and a Course Evaluation Sheet. Interview (1) was conducted for policy makers at SQU in order to identify the practice gaps in the design and development of SPOCs at Omani HEIs. The interview questions focused on three major themes related to the current application of e-learning at SQU, its readiness for providing on-campus online courses, and the establishment of policies and regulations for on-campus online courses (SPOCs). Interview (1) with policy makers was aligned with the Analysis of practical problems phase of Reeves Model and the Analysis phase of ADDIE Model. Interview (2) was conducted with instructional designers and developers of CET, e-learning experts, SMEs in order to get a reiterative formative evaluation of the design and development phase of ADDIE Model which represent Development of Solution phase in Reeves Model. The interview questions focused on the initial design principles derived from the literature review. Interview (3) was conducted with CET instructional designers and developers , e-learning experts, and SMEs in order to get a reiterative formative evaluation of the implementation phase in ADDIE Model, and Reflection to enhance the solution of Reeves Model. The interview questions focused on the validity of the final proposed design principles. The three interview tools were reviewed by experts from Instructional and Learning Technology Department at SQU, and modifications were applied based on the received feedback.
- Structured literature review was the initial tool in the second phase of Reeves Model. The initial design principles list was constructed as derived from the literature. The design of the on-campus study skills online course depended on the first draft of the proposed design principles of SPOCs.
- The Course Evaluation Sheet was used by all colleges at SQU for undergraduate students to evaluate the design and development of online courses; therefore, it was also used to evaluate the online study skills course that represented the evaluation phase of ADDIE Model. The Course Evaluation Sheet along with Interview (3) were aligned with the Reflection to enhance the solution phase of Reeves Model.
- Validity and Reliability: the three interview tools used in this study were validated in terms of their relevance, clarity and linguistic accuracy, the relation of the standard's item to each instrument's themes.
- The questions of the three interview tools used in this study were validated in terms of their relevance, clarity and linguistic accuracy by educational technology professors and lecturers from SQU. Based on the received feedback,

some interview questions were modified prior to considering the tools valid, while the reliability of the Course Evaluation Sheet was 0.88.

Analyzing of Data

This design-based research method requires multiple data analysis techniques and procedures (McKenney & Reeves, 2018). The followings are methods of analysis adopted in this study:

1. Structured literature review was used to collect different best practices of design principles for SPOCs. The initial analysis of these principles was conducted using the collected data from e-learning experts and instructional designers.

2. The researchers used thematic analysis to interpret the data gained from the interviews, categorizing them according to the type of response.

3. Course Evaluation Sheet was statistically analyzed using SPSS (Statistical Package for the Social Sciences) software. The qualitative questions in the Course Evaluation Sheet were analyzed through the description of their main findings. The data collected during the iterations of the DBR were analyzed to develop a conclusive SPOCs design principles list in line with other phase's findings.

Findings / Results

RQ1: What is the status of SPOCs design at Omani HEIs?

In order to answer the first research question regarding the status of SPOC design in Omani HEIs, policy makers in various positions at SQU were interviewed (Phase 1 of Reeves Model: Analysis of practical problems). Their answers were analyzed, categorized and presented as follows.

Online courses status

Policy makers agreed on the importance of educational technology and e-learning in teaching and learning. They agreed that e-learning at SQU has three main issues related to logistics, content, and design. The vice chancellor emphasized that "*digitization is widely spread around the world and SQU is a little bit late compared to universities in other countries in e-learning; yet, it is a key element of SQU's strategic plan"*. On the other hand, the director of the CET positively highlighted that "*SQU took the first initiative in e-learning as it started with WebCT then moved to Moodle LMS… there are good attempts to convert face-to-face courses into blended or fully online courses*". A college dean asserts that educational technology is not new as he "*…started teaching using PowerPoint presentations and then set up an online statistics course on the Moodle platform since 2005 in collaboration with CET… they have specialists who are responsible for providing training in setting up courses on Moodle*".

Readiness of SPOCs adaptation

Regarding the second theme related to SQU readiness to adopt on-campus online courses, the respondents had two opposite views. Some respondents (n=10) believed that SQU has the ingredients to adopt SPOCs since it has good infrastructure, hardware and software technology, as well as specialized centers, such as CET, to support the design, development ,and delivery of these type of courses at SQU. On the other hand, the rest of the respondents (n=9) believed that the level of SQU's readiness to adopt SPOCs is still in its early stages. They justified their views with several considerations including the modest development of the infrastructure, resistance and cultural mindset, and the lack of sufficient technical support and e-learning specialists responsible for developing the on-campus online course. One respondent stressed that the readiness for SPOCs *"…greatly depends on the nature of SQU policies and regulations*". Another respondent indicated that *"…despite the fact that CET has general policies for the design and development of e-learning, these policies need to be clearly stated and activated in the SQU academic policy guideline*". A third one emphasized "*…the copyright of the content delivered through LMS*". He added "*…content created by the faculty members should undergo a specific copyright procedure*". A fourth respondent focused on "*…the importance of preparing a professional academic and technical team to lead the design and development of on-campus online courses based on the standards and rubrics of best universal e-learning practices*". Some respondents (n=8) raised the issues of grading and assessment, probation, absenteeism, activity completion, and accessibility as they are not well explained in the current general SQU e-learning policies.

RQ2: How effective is the new designed (study skills) SPOC at SQU?

Based on the best practices of online learning in the literature review, the researchers adopted the first draft of the SPOCs design principles that include eight elements; learning management system, content, multimedia, structure, interactivity, navigation and screen design, technical support, and reporting and record keeping. This was one of the main outcomes of the Reeves' (2006) model of DBR phase 2 (Development of Solution) through the structured literature review.

Adapted list of the design principles

This first draft was then adapted using the e-Learning experts, SMEs, and IDs' views; as well as the initial list of design principles derived from the reviewed literature. Feedback received from this sample was assimilated to form the basis to develop the second draft of the SPOCs design principles. In addition, the study skills online course' blueprint was made available at this phase (Phase 3 of Reeves Model: Iterative cycles of testing).

The validated second draft design principles list consisted of four main principles: instructional design; communication, interaction and collaboration; student evaluation and assessment; and learner support and resources. Different elements are subsumed in each element to allow instructional designers and e-learning experts to clearly recognize the way in which they may use a principle as explained below.

Instructional design: this principle presents the systematic structure of SPOCs which specifies instruction through the application of learning and instructional theories and instructional system models such as ADDIE. It improves the quality of the design, development, delivery, and assessment of the SPOCs courses.

Communication, interaction, and collaboration: this principle addresses how the course design, assignments, and technology effectively interrelate to encourage interaction between the instructor, the students, and the content. SPOCs can accommodate varied learning styles by using diverse activities. Interactivity can be used to enhance the learning experience and increase students' interest and engagement in the subject through online learning activities.

Student evaluation and assessment: this principle refers to the process that institutions use to determine students' achievement and quality of work, including assignments and grades.

Learner support and resources: this principle refers to program, academic, and/or technical resources available to learners.

Contextual considerations of the design principles

As part of the Reeves' (2006) Model of DBR phase 3 (iterative cycles of testing), the study skills online course prototype was made ready and piloted. However, the application of the course and its design evaluation through Course Evaluation Sheet identified some contextual issues related specifically to absenteeism and student identity. To begin with, the Moodle LMS that was used as a platform to host the study skills online course showed neither students' absenteeism, nor their identity to ensure they are studying the content and doing the assignments independently. Moreover, the students had to attend physically to take the tests to show their identity prior to sitting for the exams.

Final list of SPOCs design principles

After considering iterative cycles of testing phase 3 outcomes, the final form of SPOCs design principles list was further reviewed and modified to include five main design principles: Instructional Design; Communication, Interaction, and Collaboration; Student Evaluation and Assessment; Learner Support and Resources; and Contextual Logistics. Each principle consists of several themes that differ depending on the type of principle as presented in Table 2.

Table 2: SPOCs design principles

Principles	**Themes**
Instructional Design	A. Structure B. Learning Goals/Objectives/Outcomes C. Course Information (Syllabus) D. Instructional Strategies E. Academic Integrity F. Use of Multimedia
Communication, Interaction and Collaboration	A. Activities and Opportunities B. Organization and Management
Student Evaluation and Assessment	A. Goals and Objectives B. Strategies C. Feedback D. Management
Learner Support and Resources	A. Institutional/Program /Academic Support and Resources
Contextual Logistics	A. Absenteeism B. Identity

RQ3: What is the best contextual design framework of SPOCs that fits Omani HEI environments?
As part of the Reeves' (2006) Model of DBR phase 4 (reflection to enhance solution), the researchers used the final list of SPOCs design principles to evaluate each principle's effectiveness during the on-campus study skills course implementation. The instructional designers and e-learning experts used this final list of SPOCs design principles to measure the course for its relevance, clarity, and compliance to the principles.

The list comprised all the five principles aligned to their themes which were, in turn, categorized into one or more categories. For example, the theme 'Structure' of the instructional design principle was categorized into Sequence, Systematic Organization, Purpose, Gradebook, and Content. They were measured for their relevance, clarity, and affiliation. A five rating scale rubrics was provided for each subcategory (exist, developing, met, exceed, and N/A) to measure its effectiveness as illustrated in Table. 3.

Table. 3. Examples of design principles categories

A: The Structure							
#	**Category**	**Term**	**Non-Existent**	**Developing**	**Meets**	**Exceeds**	**N/A**
A: 1	**Sequence**	Content is sequenced and structured in a manner that enables learners to achieve the stated goals.	◯	◯	◯	◯	◯
A:2	**Systematically Organized**	Information is grouped (by week, module, or unit) to help students learn the content.	◯	◯	◯	◯	◯
A:3	**Purpose**	Purpose of unit learning objectives is clearly presented.	◯	◯	◯	◯	◯
A:4	**Gradebook**	A gradebook is available for checking progress. Generally located in the main navigation buttons.	◯	◯	◯	◯	◯
A:5	**Content**	A clear, concise list of modules and activities that will be completed within each of the course modules/ chapters/ topics is provided.	◯	◯	◯	◯	◯

The design principle added by the researchers was contextual logistics. Within this principle, the researchers added two themes: absenteeism and students' identity as demonstrated in Table 4.

Table. 4. The developed themes and categories of the contextual logistics design principle

A. absenteeism							
#	**Category**	**Term**	**Non-Existent**	**Developing**	**Meets**	**Exceeds**	**N/A**
A:1	**Course absenteeism**	Course counts students' attendance based on their progress in accomplishing their weekly activities	◯	◯	◯	◯	◯
B. student's identity							
#	**Category**	**Term**	**Non-Existent**	**Developing**	**Meets**	**Exceeds**	**N/A**
B:1	**Student's identity**	The content of lessons linked to their formative quizzes, which is also linked to the summative assessment of the units.	◯	◯	◯	◯	◯
B:2		Activities, quizzes, and exams within each lesson or unit are considered parts of the Mid-Term and Final Exam.	◯	◯	◯	◯	◯
B:3		Mid-Term and Final Exam are provided online, but students will take these exams on campus in specific computer-lap rooms or a designated location.	◯	◯	◯	◯	◯

To measure the effectiveness of the new designed SPOC, the added principle was validated by SMEs, instructional designers and developers, and e-learning experts in terms of its relevance to the category, clarity and linguistic accuracy, and the relation of the statement to the instrument themes. Then, based on the feedback received, the researchers refined and finalized the SPOCs design principles list to serve as a guide for instructional designers, educational technologists, and SMEs in designing contextual online courses in their HEIs. To sum up, the contextual logistics principle and its themes, which is considered the main contribution of this research, was derived from the application of the online study skills course.

Discussion

The findings indicate a need for contextualized design principles to be implemented by SQU. The outcome of phase one led the researchers into phase two to review the best universal practices of online course design principles. The main result was a four-category design principles checklist. The researchers used this list in phase three to redesign and develop the study skills online course. The crucial finding of this phase recommends solutions to some contextual issues related to absenteeism and student identity, which appear in the local and global literature review as the most common issues faced in the design and development of online courses (Akinyemi & Al Musawi, 2002; Alperin et al., 2017; Osman, 2020).

The status of SPOCs design at Omani HEIs

Although SQU is partially ready to adopt SPOCs, there is a lack of standardized and contextualized policies to put in place when faculty members need to design and develop SPOCs. Moreover, the course structure issue was pointed out by a number of respondents in terms of the course form, whether it is a blended or fully online course, and whether it is student self-based or instructor-led. The findings of this theme are supported by Akinyemi (2003), Hall (2009) and Al Musawi (2010).

Generally, results related to question one in the interview showed that SQU is ready to design and develop its SPOCs. This corresponds to Al Musawi (2007) finding that most of HEIs are ready for designing and developing SPOCs. However, there are some considerations that need to be taken into account while designing and developing SPOCs as proposed by many researchers (Al Musawi & Abdelraheem, 2004; Al Shihi et al., 2015; Osman, 2020; Osman & Abdelraheem, 2003). The results of this study indicate that most of the online courses at HEIs are content-based, which agrees with the findings of Osman (2020), Sederberg (2003), and Al Musawi (2010). Additionally, the interview responses highlight the need for quality assurance standards that should be followed as previous research studies showed (Al-Kindi & Al-Khanjari, 2017). Moreover, Al Shihi et al. (2015), and Al-Kindi et al. (2017) believe that designing and developing online courses should meet specific theoretical and practical techniques, methods, and standards that totally align with the interview results.

It seems that SQU has been considering the adoption of online courses and has started to embed the standards for e-learning policies in its strategic plan. Further, SQU recruits specialists to increase the quality of online courses and professional development. These findings are similar to those of Osman (2020), Akinyemi & Al Musawi (2002), Osman and Abdelraheem (2003), and Al Musawi (2007).

The effectiveness of the new designed (study skills) SPOC at SQU

Regarding the effectiveness of the new online designed course, it is obvious that the instructional design process followed in the design and development of the study skills course is essential for the quality of the course. Fox (2017) and Al Shihi et al. (2015) stressed the importance of instructional design process to increase the quality of a newly designed or redesigned online courses. Despite following the instructional design process (Lu, 2018) when designing and developing the study skills course, two major issues emerged; students' absenteeism and identification in the study skills course. Therefore, this finding, in relation to absenteeism and identity, appeared to be incongruence with relevant international literature (Hew & Cheung, 2014; McGahan et al., 2015). Since the two contextual issues are quite related to each other, the instructional designers and developers suggested that the course counts the students' absence depending on the progress of their weekly learning activities. Concerning students' identity , they suggested a different systematic process in the course structure. First, the content of lessons was linked to their formative quizzes, which was also linked to the summative assessment of the unit. Second, all activities, quizzes, and exams were regarded as essential parts of the mid-term and final exams. Third, the mid-term and final exams were provided online, but students were obligated to take these exams on-campus in specific computer-lab rooms, and students had to present their university ID before starting the exams.

The contextual design framework of SPOCs that best fits Omani HEI e-learning environments

The main purpose of design-based research (DBR) is to increase the impact and transfer of educational research and generate pragmatic and generalizable design principles. The DBR collects, analyses, and mixes qualitative and quantitative data during the research process within a single study to examine a research problem comprehensively

(Creswell, 2014). This study illustrated that DBR is one of the most suitable research methodologies for developmental studies. The findings of this study highlight the importance of contextual logistics that need to be considered in the design and development of SPOCs. Although the results were derived from the Omani context, they appear to be in congruence with previous literature, especially with similar findings related to the issues of absenteeism and identification (Al-Kindi & Al-Khanjari, 2017; Al Musawi, 2010; Osman, 2020; Sederberg, 2003). As a result, absenteeism and identification were added as categories to be considered in designing online courses in Omani HEIs.

Finally, the researchers validated the new proposed context category: contextual logistics, and formed the final list of design principles which consists of five categories: instructional design; communication, interaction, and collaboration; student evaluation and assessment; learner support and resources; and contextual logistics.

Figure 2 presents the final design principles framework of SPOCs and summarizes the main findings of this study. It describes the final set of SPOCs design principles that forms a contextually validated framework.

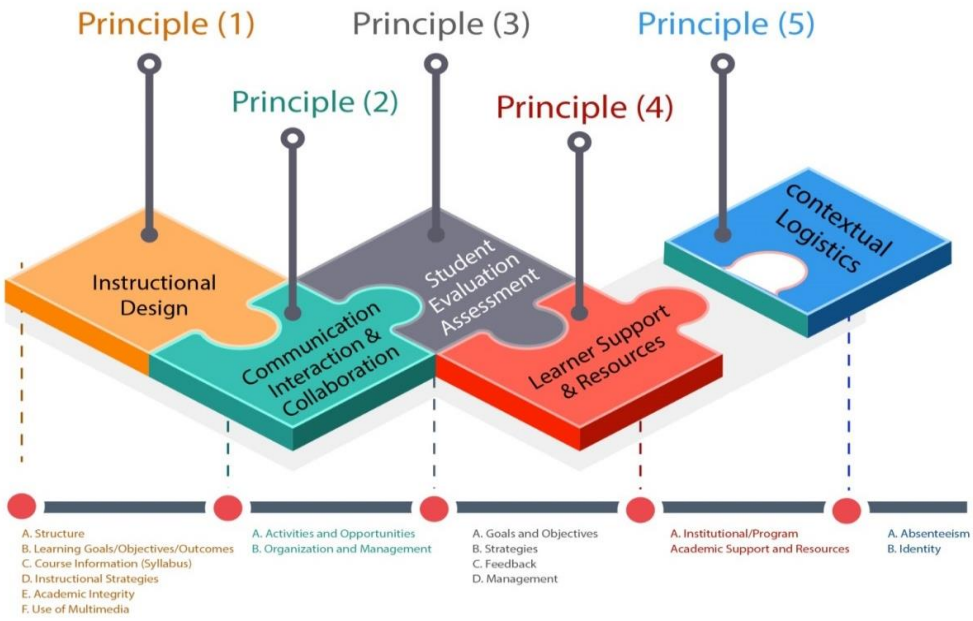

Figure. 2: The design framework of SPOCs for Omani HEIs

Conclusion

This study highlights a design framework for a SPOC offered at Sultan Qaboos University. The major finding of this study is the fifth design principle, contextual logistics. Other findings are illustrated as follows:

1. On-campus online courses in HEIs, and in SQU in particular, lack precise contextual design and development standards.

2. There are plenty of best universal practices of design principles; however, the researchers found that these principles can best be categorized into four main categories: instructional design; communication, interaction and collaboration; student evaluation and assessment; and learner support and resources.

3. Although the new designed course was redesigned based on these four design categories, it encountered some contextual issues such as student absenteeism and identity, which led to the need for a fifth category to solve these issues.

4. The contextual design framework of SPOCs for Omani HEIs proposed by the researchers contains five categories including instructional design; communication, interaction, and collaboration; student evaluation and assessment; learner support and resources; and contextual logistics.

Recommendations

Based on the main research findings, it can be recommended that international standards should be adapted to meet societal needs and problems in the implementation of SPOCs. Issues related to assessment and activities need to be investigated and aligned with the goals and objectives to ensure a successful online courses implementation. The findings of this study also highlight the importance of contextual logistics that need to be considered in the design and development of SPOCs. Furthermore, it is recommended that Omani HEIs in general, and SQU in particular, adapt the proposed framework. In addition, it recommends further studies to investigate the impact of the proposed contextual design framework on students' performance in other content areas, and attitudes towards online instruction, as well as

return on investments in developing online courses. Based on the findings and recommendations of this DBR study, the researchers recommend further research as follows:

1. Conducting a study to test the impact of the proposed design framework on other courses and contexts in SQU or other Omani HEIs.
2. Conducting a study to measure the impact of the proposed contextual design framework on students' performance (mid-term test and the final exam), behavior and return on investments, which were not measured in the current study.

Limitations

Although the study was conducted in SQU, the generalizability of its findings to other Omani HEIs, or other, settings remains limited by factors such as the institution size, technical capabilities, and human resources. Other limitations such as local e-learning applications, and policies and practices should be considered especially within existing circumstances of Coronavirus COVID-19 and the wide, but inadvertent, application of e-learning.

References

Abed, L. A. (2020). Perceptions and proposals of university of Jordan faculty members towards using massive open online courses in the educational process. *International Journal of Educational Methodology, 6*(1), 13-24. https://doi.org/10.12973/ijem.6.1.13

Akinyemi, A. (2003). Web-based learning and cultural interference: perspectives of Arab students. In A. Rossett (Ed.), *Proceedings of E-Learn 2003--World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 1858-1862). Association for the Advancement of Computing in Education.

Akinyemi, A., & Al Musawi, A. (2002). Re-orientating instructional development practice in higher education: A case of Sultan Qaboos University. *Surveys in linguistics and language teaching III, e-learning and e-research, European University Studies Journal*, *21*(112), 29-37.

Al Musawi, A. (2010). E-learning in Oman: E-learning from an Omani perspective. In U. Demiray (Ed.), *E-Learning Perspectives* (1st ed., pp. 533-554). Anadolu University.

Al Musawi, A. S. (2007). Current status of educational technologies at Omani higher education institutions and their future prospective. *Educational Technology Research and Development*, *55*(4), 395-410. https://doi.org/10.1007/s11423-007-9041-x

Al Musawi, A. S., & Abdelraheem, A. Y. (2004). E-learning at Sultan Qaboos University: Status and future. *British Journal of Educational Technology 35*(3), 363-367.

Al Shihi, H., Gattoufi, B., & Gulvady, S. (2015, March 25-26). *Introducing MOOCs to universities in Oman – policies and regulations– CAS perspective* [Paper presentation]. 3rd International Conference of the Omani Society for Educational Technology (ICOET 2015), Muscat, Oman.

Alario-Hoyos, C. Pérez-Sanagustín, M. Cormier, D. & Delgado-Kloos, C. (2014). Proposal for a conceptual framework for educators to describe and design MOOCs. *Journal of Universal Computer Science, 20*(1), 6-23

Al-Kindi, I., Al-Khanjari, Z., & Kraiem, N. (2017, February, 14-15). *Sultan Qaboos University between e-learning and massive open online course: Future vision* [Paper presentation]. Free and Open-Source Software Conference (FOSSC-17). Sultan Qaboos University, Muscat, Sultanate of Oman.

Ally, M. (2011). *Best practices and standards for e-learning*. Athabasca University.

Alperin, M., Lloyd, L., McCormick, L., Bergland, B., Carvalho, M., Tripathi, M., Patel, A., & Miner, K. (2017). Distance education and learning: An innovative approach to extending workforce training capacity. *Pedagogy in Health Promotion, 3*(1S), 40S-46S. https://doi.org/10.1177%2F2373379917697063

Annabi, C. A., & Wilkins, S. (2016). The use of MOOCs in transnational higher education for accreditation of prior learning, programme delivery, and professional development. *International Journal of Educational Management, 30*(6), 959-975. https://doi.org/10.1108/IJEM-05-2015-0057

Balaji, R. D., Al-Mahri, F., & Al-Fatnassi, T. (2015). *Social impact of MOOC's in Oman higher education*. Arxiv. https://arxiv.org/pdf/1504.01861

Baldwin, S. J., & Trespalacios, J. (2017). Evaluation instruments and good practices in online education. *Online Learning*, *21*(2), 1-18. https://doi.org/10.24059/olj.v21i2.913

Bigirwa, J.P., Ndawula, S., & Naluwemba, E.F. (2020). On-line quality management a precursor for improving e-learning adoption in midwifery schools in Uganda. *International Journal of Educational Methodology, 6*(2), 271-283. https://doi.org/10.12973/ijem.6.2.271

California Community College Online Education Initiative. (2016). Course design rubric for the online education initiative. http://cvc.edu/wp-content/uploads/2016/11/OEI_CourseDesignRubric_Nov2016-3.pdf

Elkins, D., & Pinder, D. (2015). *E-learning fundamentals: A practical guide* (1st ed.). Association for Talent Development (ATD).

Endean, M., Bai, B., & Du, R. (2010). Quality standards in online distance education. *International Journal of Continuing Education and Lifelong Learning, 3*(1), 53-71.

Fox, A. (2017). Can MOOCs and SPOCs help scale residential education while maintaining high quality? In E. Losh, *MOOCs and their afterlives: experiments in scale and access in higher education* (1st ed.). The University of Chicago Press Books.

Fox, A., Patterson, D. A., Ilson, R., Joseph, S., Walcott-Justice, K., & Williams, R. (2014). *Software engineering curriculum technology transfer: lessons learned from MOOCs and SPOCs* (Technical Report No. UCB/EECS-2014-17). http://www.eecs.berkeley.edu/Pubs/TechRpts/2014/EECS-2014-17.html

Gormley, C. (2014). Teaching the principles of effective online course design: what works? *Irish Journal of Academic Practice*, *3*(1), 1-30.

Hew, K. F., & Cheung, W. S. (2014). Students' and instructors' use of massive open online courses (MOOCs): motivation and challenges. *Educational Research Review, 12*(1), 45-58

Illinois Online Network (2008). *Quality online course initiative rubric*. http://www.ion.uillinois.edu/

Khan, B. (2005). Learning features in an open, flexible and distributed environment. *AACE Journal*, *13*(2), 137-153.

Kulshrestha, M., & Sharma, R. (2017). Awareness and utilization of massive open online resources: an empirical study among teachers engaged in higher education in Delhi and national capital region. *International Journal of Business and Administration Research Review*, *3*(18), 5-13.

Liu, Z. (2016). A study on deep integration of English for specific purpose SPOC with English for general purpose teaching. *IOSR Journal of Research & Method in Education, 6*(5), 1-4. https://doi.org/10.9790/7388-0605030104

Martin, F., Parker, M. A., & Deale, D. F. (2012). Examining interactivity in synchronous virtual classrooms. *The International Review of Research in Open and Distributed Learning*, *13*(3), 228-261. https://doi.org/10.19173/irrodl.v13i3.1174

McGahan, S. J., Jackson C. M., & Premer, K. (2015). Online course quality assurance: development of a quality checklist. *InSight: A Journal of Scholarly Teaching, 10*, 126-140

Mckenney, S. & Reeves, T. (2018). *Conducting educational design research* (2nd ed.). Routledge. https://doi.org/10.4324/9781315105642.

Osman, M., & Abdelraheem, A. (2003, October 20-22). *Web assisted instruction: its potentials and impact on students' learning and attitudes* [Paper presentation]. International Conference of Educational Technology Conference & Exhibition (ETEX2003), Sultan Qaboos University, Muscat, Sultanate of Oman.

Osman, M. E. (2020) Global impact of COVID-19 on education systems: the emergency remote teaching at Sultan Qaboos University. *Journal of Education for Teaching*, *46*(4), 463-471. https://doi.org/10.1080/02607476.2020.1802583

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.

Plomp, T. (2007). Educational design research: An introduction. In T. Plomp & N. Nieveen (Eds.), *Educational design research: An introduction* (pp. 9-36). SLO.

Reeves, T.C. (2006). Design research from a technology perspective. In J. Van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.), Educational design research (pp. 52-66). Routledge.

Sederberg, L. (2003). *Exemplary online instruction: Rubric for online instruction*. California State University, Chico. https://www.csuchico.edu/eoi/_assets/documents/rubric-for-online-instruction-accessible.pdf

Sultan Qaboos University (2018). Academic regulations for e-learning and distant education. https://shorturl.at/JQY19 [In Arabic]

California State University, Chico. (2020). *The Office of Faculty Development*. https://www.csuchico.edu/fdev/

Vai, M., & Sosulski, K. (2011). *Essentials of online course design: A standards-based guide*. Routledge.