

Instructional Design Quality: An Evaluation of Open Education Europa Networks' Open Courses using the First Principles of Instruction

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Abstract: *Open courses needs effective platform for effective organizations and management of the online courses to enhance proactive online learning. The purpose of the study is to evaluate Open Courses (OCs) using the first principles of instruction. The collection of data was carried out using inventory through evaluations of the various OCs. 27 randomly courses were chosen from Open Education Europa Networks (OEEEN). Findings showed that Instructional design of the various courses were poorly designed however, most of the courses do not follow the principles of instructions. The study shows how learners engage in activities that help them learn fast and how instructors use skills of information technology to aid the instructional design processes. Data were analyzed using descriptive quantitative methods in Statistical Package for the Social Sciences (SPSS). Through the lens of the principles of instruction, the results of the study showed that the instructional design of various courses were not so successful. It also showed that there were statistical significant differences in instructional materials designs by OCs designers.*

Keywords: Instructional Design Quality, Open Courses, Open Education Europa Networks, First Principles of Instruction, Online Learning

1. Introduction

Information technology is increasing at a high speed. It has a strong influence on online learning which is playing a unique role in sharing and accessing higher educational resources for the purpose of educating the society; this trend in the information technology has created ways for online open courses (Universities UK, 2011). Education is about sharing knowledge with vast openness of the mind to learn. Therefore openness is the cornerstone of open courses giving privileges to learners and educators around the world to create, share, use, update and revise course materials and other educational resources [1]. These routines are generally used to portray online learning, distance learning, OCs, E-learning, and Massive Open Online Courses, and they have the long history of educating learners and the society [1, 3]. Engaging in this movement by platforms requires different methods that instructional designers will need to consider in designing the materials. Using principles or theories for creating instructional materials, mediums of delivering, geographical factors etc. is needed to know the learning styles of learners and methods of engagement.

2. Theoretical Framework

Research has shown that the use of First Principles of Instruction in education improves student learning and satisfaction [2, 5], [9]. Although, several articles describe First Principles of Instruction including methods for implementing and evaluating these principles [6] experience has shown it can be difficult to apply this theory into educational practice. Merrill [4] highlighted five principles of instruction that when applied in teaching and instructional design will engage the students in activities that will help them in learning more. See figure 1.



Figure 1: First Principles of Instruction Merrill [5].

- **Problem or Task-Centered** – states that learners learn more when they see real-world examples and solve real-world problems.
- **Activation** – states that learners learn more when they actively cogitate what they already know about a topic and associate what they learn to what they already know.
- **Demonstration** – states that learners learn more when they learn relevant knowledge and skills in the context of a real-world task.
- **Application** – states that learners learn more when they apply what they have learned in a real-world context and receive feedback and guidance on how their performance.
- **Integration** - states that learners learn more when they are directed reflect on, discuss, debate, present on, or plan how to use new knowledge and skills.

This principle can be used in developing quality instructional materials which promote activities, such as engaging and interaction of learners. However, the motivations of learners help student learn fast when faced with more challenging problems. Therefore, we look at instructional design as creating the environment for learning by structuring the content and creating activities that

engages student and facilitate meaningful learning. We can say that instructional design supports the processes of learning than teaching whereby the structural designer are not the subject matter but how it will collaborate with the expert to create an environment where learners participate in rich meaningful learning experiences. Instructional design is defined as “a systematic processes that are employed to develop education and training programs in a constant reliable fashion” [9]. First principles of instructions are relevant to complex learning of real world and whole task base on a synthesis of instructional design theories. Merrill [5] argued that student learning will be promoted when instruction is problem or task center. It is worth to mention that, when learning is moving forward learners begin to acquire skill in the context of the real-world problems. Which points out that, memorizing and practical learning is an aspect of acquiring skill in the sense that when learners are engaged in solving problems and building knowledge they learn better than when an information is giving to them without a problem or exercises to solve. Instructional effectiveness of a course will be enhanced if the learning activities in the course give learners an opportunity to solve real-world problems, working through a progression of interrelated tasks, from the least difficult to the most difficult, that reflects the complexity of real-world setting. Model of instructional design may be view as a framework for developing modules or lesson that increase and enhanced the possibilities of learning and encouragement of the learner so that the learner learns faster and gain understanding of the subject. Activation principles are promoted when the learners apply their previous knowledge into their new knowledge. Therefore leaning is promoted when relevant previous experience is activated into newly acquire knowledge [7]. Instructional designers need to look at the previous knowledge of the learner in other to know where to start designing the instructional materials by asking the learners some relevant questions. Most instructional designers jump into new topic or instructional materials without laying a good foundation for the learners. If the learner has the foundations, then there is no need but if not then the first phase principle of instruction need to come in place by laying a foundation to the learners and also the instructor can derive a means of teaching the learners from the scratch.

Collective principles come in place when the learner shares his new knowledge and contribute to the collective knowledge in form of asking questions and giving his own ideas. Collaboration principles come in place when learners work as a team or collaborate with each other to perform certain task. Differentiation principles are promoted when different learners are provided with different places of learning and according to their need. Authentic resources are considered when learners learning materials are drawn from real world setting that is, giving real world examples. Feedback principles is archived when instructor provide learners with the outcome of their performance in the courses Margaryan et al [8].

3. Methodology

This study seeks to evaluate instructional design quality of open courses which can be accessed through the open

education Europa networks. “What is the instructional design quality of open courses which can be accessed through the open education Europa networks?” The study further addresses the aforementioned question through the following 4 sub-research questions:

- i. To what extent are the courses problem centered?
- ii. To what extent do the courses activities help activate, demonstrate, apply and integrate learners’ relevant knowledge?
- iii. To what extent do the courses promote collective knowledge and collaboration?
- iv. To what extent does the course provide activity options to meet different, authentic and feedback learning needs?

3.1. Research Design

Quantitative research focuses on gathering numerical data and generalizing it across groups of people. The study will be discussed based on the first principles of instruction. The quantitative method was used for this study. Survey was used to gather online data via the website of OCs via Open Education Europa Networks.

3.2. Research Participants

Random sample was used to collect data from European Open Education Network website. 27 sample OCs courses where chosen randomly via openeducationeuropa.eu which contains the population for this study.

3.3. Data Collection Instruments

The survey questionnaire designed by Margaryan and Collis was adopted for this study [12]. It consisted of 3 sections namely; Section1 (Course details) has 7 items which aimed capturing data about the course such as course name, course date, course website, course types, course platforms, course director and date of analysis; Section 2: (Objectives and Organization) has 6 questions and Section 3 (First Principles) has 24 questions. Section 3 questions were grouped according to the first principles; problem centers principles (3.1-3.5 and 3.9), activation principles (3.10), demonstrations principles (3.6-3.7), application principles (3.11), integration principles (3.12), collective’s principles (3.14-3.16), as collaborations principles (3.17-3.20, 3.23-3.24), differentiation principles (3.13), authentic resources (3.8) and feedback principles (3.21-3.22). See Appendix I. Statistical Package for the Social Sciences (SPSS) was used in data descriptive data analysis for summarization of data for clear representation and understanding.

3.4. Data Analysis

The study viewed the quality instructional design of OCs based on the first principle of instruction. 27 courses were chosen for this study. From observation, Open Courses materials of most OCs are not up to date but can be accessed since the University still offers it. The examination of all related course information took much time. The courses are categories into subject for easy searching and navigation. After the collection and analysis of the whole 27 courses the

data were review to ensure the accuracy and to have a correct data.

4. Findings and Discussion

The aim of the study was to assess Instructional design quality of open courses which can be accessed through the open education Europa Networks. Quantitative data was examined to gain a comprehensive understanding of instructional design quality and awareness of the topic under study.

4.1. Question 1: To what extent are the courses problem centered?

27 OCs courses were accessed through the Open Educational Europa Networks, below are the cases and OCs Problem center principles according to problem centres principles in Table 1.

Table 1: Overall problem center principles

Valid	Open courses problem centres principles (n=27)				Cases
	None	To some extent	To large extent	To very large extent	
1. Real-world problems	12 (44.4%)	9 (33.3%)	2 (7.4%)	0%	4 (14.8%)
2. Real world leaners encounter	7 (25.9%)	11 (40.7%)	2 (7.4%)	0%	7 (25.9%)
3. Work place problems	2 (7.4%)	5 (18.5%)	3 (11.1%)	4 (14.8%)	13 (48.1%)
4. Ill-structure problems	4 (14.8%)	5 (18.5%)	4 (14.8%)	0%	14 (51.9%)
5. Divergent from; one another	8 (29.6%)	0%	4 (14.8%)	0%	15 (55.6%)
6. Activities build upon each other's	5 (18.5%)	2 (7.4%)	2 (7.4%)	0%	18 (66.7%)

As seen in Table 1, case 1 with 44.4% indicates that the OCs did not include activities that are relevant to real world problems. In case 2, 40.7% indicates that, the problems in the courses typical to those that learners will encounter in the real world were to some represented. In case 3, 48.1 % indicates that, the activities in the course that relate to the participants real workplace problem left no information to the researcher. In case 4, 51.9% indicates that, the problems are ill-structure left no information to the researcher. In case 5, 55.6% indicates that, there was no information left, regarding the problems divergent from one another. In case 6, 66.7% indicates that the activities build upon each other left no information regarding the activity. From this Table 1, the OCs accessed through the Open Education European Networks are not problem centered. The result suggests that larger percentage of the course did not include activities that have problem examples.

4.2. Question 2: To what extent do the courses activities help activate, demonstrate, apply and integrate learners' relevant knowledge?

27 OCs courses were accessed through the Open Educational Europa Networks, below can be found the cases and OCs activation principles according to Activation, Demonstrations, Application and integration principles in the Table 2.

Table 2: Overall OCs activations principles

Valid	Overall OCs activations principles (n=27)				Cases
	None	To some extent	To large extent	To very large extent	
1. Prior knowledge	7 (25.9%)	3 (11.1%)	2 (7.4%)	4 (14.8%)	11 (40.7%)
2. Examples solutions	19 (70.4%)	4 (14.8%)	0%	0%	4 (14.8%)
3. Newly acquired skills	13 (48.1%)	2 (7.4%)	0%	6 (22.2%)	6 (22.2%)
4. Integrate new skills into everyday work	15 (55.6%)	5 (18.5%)	0%	0%	7 (25.9%)

As seen from Table 2, in case 1, 40.7% indicates that, the activities that attempt to activate learner's relevant prior knowledge, left no information regarding the activities the learners are involved. Few amount of OCs indicated activation principles, by requiring learner to have passed relevant courses before proceeding to the other program. According to Merrill [5], without a prior knowledge learners must have to enroll for the foundation courses before registration for the next course. In case 2, 70.4% indicates that, demonstrations examples of problem solution are not included in the OCs. In case 3, 48.1% indicates that, the application examples that require learners to apply their newly acquired knowledge and skill are not included in the OCs. In case 4, 55.6% indicates that, the activities that require learners to integrate their new knowledge are not included in the OCs. The above finding suggests that activation principles are not adopted in the overall OCs accessed through Open Educational Europa Networks.

4.3. Question 3: To what extent do the courses promote collective knowledge and collaboration?

27 OCs courses were accessed through the Open Educational Europa Networks, below are the cases and OCs collectives and collaborative principles according to collaboration principles in the Table 3.

Table 3: OCs collectives according to collaborative principles

Valid Cases	OCs collective and collaborative principles (n=27)				Cases No info
	None	To some extent	To large extent	To very large extent	
1. Learn from each other's	12 (44.4%)	2 (7.4%)	4 (14.8%)	0%	9 (33.3%)
2. Consumed knowledge	20 (74.1%)	0%	0%	0%	7 (25.9%)
Collaboration					
3. Collaborate with other learner	14 (51.9%)	8 (29.6%)	0%	0%	5 (18.5%)
4. Outside collaborate	24 (88.9%)	0%	0%	0%	3 (11.1%)
5. Peer interaction groups	17 (62.9%)	0%	0%	0%	10 (37%)
6. Clearly identified	17 (63%)	0%	0%	0%	10 (37%)

As seen from Table 3, in case 1, 44.4% indicates that, the activities that require participants to learn from each other was not included in the OCs. In case 2, 74.1% indicates that, the activities that require participants to contribute to collective knowledge are not included in the OCs. In case 3, 51.9% indicates that, the activities that require learners to build on other participants submission was not included in the OCs. In case 4, 51.9% indicates that, the activities that require participants to collaborate with other course participants was not included in the OCs. In case 5, 88.9% indicates that, the activities that required learners to collaborate with others outside the course was not included in the OCs. In case 6, 62.9% courses did not include peer interaction group that comprises with different backgrounds. In case 7, 63% indicates that, the individual contribution of each learners were not included in the OCs. The above finding suggests that, the collective and collaborative principles were not adopted in the overall OCs accessed through the Open Educational Europa Networks.

4.4. Question 4: To what extent do the courses provide activity options to meet different, authentic and feedback learning needs?

27 OCs courses were accessed through the Open Educational Europa Networks, below are the cases and OCs Differentiation, Authentic and feedback principles in the Table 4.

Table 4: OCs differentiation, Authentic and feedback principles

Valid Cases	OCs differentiation, Authentic resources and feedback principles (n=27)				Cases No info
	None	To some extent	To large extent	To very large extent	
Differentiation					
Learning need	18 (66.7%)	0%	2 (7.4%)	4 (14.8%)	3 (11.1%)
Authentic resources					
Real world settings	8 (29.6%)	2 (7.4%)	6 (22.2%)	0%	11 (40.7%)
Feedback principles					
Feedback	Yes	No			No info
Feedback by instructors	5 (18.5%)	15 (56.6%)	0%	0%	7 (25.9%)
Feedback explained	0%	9 (33.3%)	0%	0%	18 (66.7%)

As seen from Table 4, in case 1, 66.7% indicates that, the activities options for participant with various learning need was not included in the OCs. In case 2, 40.7% indicates that, there was no information regarding the authentic resources that are reused from real world setting in the OCs. In case 3, 56.6% indicates that, the feedback activities were not included in the OCs. In case 4, 66.7% indicates that, there was no information on whether the feedback was properly explained. The above findings suggests that, differentiation, authentic resources and feedback principles gave no information to the researcher and were actually lacking in the OCs accessed through Open Educational Networks.

5. Conclusion

The study examined the instructional quality of 27 OCs. Most of the courses applied few of the principles on the courses. Data were gathered through an inventory and were analyzed using techniques of analysis. The instructional quality design of each courses were analyzed using set criteria of first principles of instructions. Most of the analyzed courses showed limited evidence of the first principles of instruction and some showed none existence of the principles of instruction in the courses. Firstly, the courses were examine whether or not the courses specified learning objectives and determine the extent to which course objectives were measurable. Secondly, the course were analyzed whether or not the course had specific learning outcome, that is , what the learner will be able to do upon completion of the courses, Thirdly the courses were analyzed to which extent the course materials were well organized or not. Fourthly, the courses were determined whether or not the course requirement and the overall description were clearly outlined. Results presented in Table's 1-4 shows that majority of the open courses were not designed according to the first principles of instruction or rather the designers did not constructively consider taking the advantage the principles had to offer during the OCs design.

6. Recommendation

Further studies should strongly consider the necessity of the use of instructional principles in designing Open Courses (OCs) materials. The OCs should use and include these principles to carry out systematic comparative studies of instructional quality consideration various courses and should remodel/redesign the instructional materials using the first principles of instruction where necessary in order to take total advantage of all the principles has to offer. Open Courses of selected Universities can also be evaluated to enhance their learning engagements through research. Further research and possible improvements in practice of online courses can be made in the future using the first principles of instruction.

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APPENDIX I: QUESTIONNAIRE
SECTION 1. COURSE DETAILS

- 1.1. Course name:
- 1.2. Course dates:
- 1.3. Course website:
- 1.4. Course type: cMOOCs xMOOCs OCs
- 1.5. Course platform:
- 1.6. Course director:
- 1.7. Date of analysis:

SECTION 2. OBJECTIVES AND ORGANISATION

- 2.1. Does the course specify the learner population that will engage in the course?
Yes No
- 2.2. Does the course specify the change that needs to be promoted in the skill set of the learner population?
Yes No
- 2.3. To what extent are the course objectives measurable?
None To some extent To large extent To very large extent N/A N/I
- 2.4. To what extent are the course materials well organised?
None To some extent To large extent To very large extent N/I
- 2.5. Are the course requirements clearly outlined?
Yes No
- 2.6. Is the course description clear?
Yes No

SECTION 3. FIRST PRINCIPLES

- 3.1. To what extent are the course objectives relevant to real-world problems?
None To some extent To large extent To very large extent N/A N/I
- 3.2. To what extent are the problems in the course typical of those learners will encounter in the real world?
None To some extent To large extent To very large extent N/A N/I
- 3.3. To what extent do the activities in the course relate to the participants' real workplace problems?
None To some extent To large extent To very large extent N/I
- 3.4. To what extent are the problems ill-structured – ie have more than one correct solution?
None To some extent To large extent To very large extent N/A N/I
- 3.5. To what extent are the problems divergent from one another?
None To some extent To large extent To very large extent N/A N/I
- 3.6. Are there examples of problem solutions?
Yes No N/A
- 3.7. If there are examples of solutions, to what extent do these solutions represent a range of quality from excellent examples to poor examples?
None To some extent To large extent To very large extent N/A N/I
- 3.8. To what extent are the resources reused from real-world settings?
None To some extent To large extent To very large extent N/I
- 3.9. To what extent do the activities build upon each other?
None To some extent To large extent To very large extent N/I

- 3.10. To what extent do the activities attempt to activate learners' relevant prior knowledge or experience?
None To some extent To large extent To very large extent N/I
- 3.11. To what extent do the activities require learners to apply their newly acquired knowledge or skill?
None To some extent To large extent To very large extent N/I
- 3.12. To what extent do the activities require learners to integrate the new knowledge or skill into their everyday work?
None To some extent To large extent To very large extent N/I
- 3.13. To what extent are there activity options for participants with various learning needs?
None To some extent To large extent To very large extent N/I
- 3.14. To what extent do the activities require participants to learn from each other?
None To some extent To large extent To very large extent N/I
- 3.15. To what extent do the activities require participants to contribute to the collective knowledge, rather than merely consume knowledge
None To some extent To large extent To very large extent N/I
- 3.16. To what extent do the activities require learners to build on other participants' submissions?
None To some extent To large extent To very large extent N/I
- 3.17. To what extent do the activities require participants to collaborate with other course participants?
None To some extent To large extent To very large extent N/I
- 3.18. To what extent do the activities require participants to collaborate with others outside the course?
None To some extent To large extent To very large extent N/I
- 3.19. To what extent do the activities require that the peer-interaction groups be comprised of individuals with different backgrounds, opinions, and skills?
None To some extent To large extent To very large extent N/A N/I
- 3.20. To what extent can the individual contribution of each learner in the group be clearly identified?
None To some extent To large extent To very large extent N/A N/I
- 3.21. Is there feedback on activities by the instructor(s) in this course?
Yes No
- 3.22. If there is feedback, is the way feedback will be provided clearly explained to the participants?
Yes No N/A
- 3.23. Are the peer-interaction groups given specific directions for interaction?
Yes No N/A
- 3.24. Does each member of a peer-interaction group have a specific role to play?
Yes No N/A