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Students' perspective on knowledge quality in eLearning context: a qualitative assessment

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Abstract

Purpose – The purpose of this paper is to identify the unique dimensions associated with knowledge quality (KQ) based on students' perception in an educational institution.

Design/methodology/approach – Purposive sampling was used to select students who were active users of the electronic-Learning (eLearning) system at two faculties in a single university. The qualitative data gathering employed an unstructured open-ended questionnaire distributed to the 52 selected participants.

Findings – The qualitative findings unearth the students' perspective about quality of knowledge gained from content used in online courses. In total, 34 underlying sub-dimensions of KQ emerged, which were categorized into five KQ dimensions: intrinsic KQ, contextual KQ, representational KQ, accessible KQ, and actionable KQ.

Research limitations/implications – The findings provide an insight to educators to consider KQ dimensions in providing quality knowledge to students in an eLearning environment.

Originality/value – Previous studies have used information quality dimensions to measure KQ because of a lack of conceptualization of KQ that leads to difficulties in operationalizing this construct. In this study, a conceptual and operational definition of KQ, in the context of eLearning, is proposed based on grounded data from students participating in an online learning environment.

Keywords Qualitative research, eLearning knowledge quality, Knowledge quality,
Student's perspective

Paper type Research paper

1. Introduction

The educational sector has taken a novel inclination toward the online learning in-line with the development in information technology. electronic-Learning (eLearning) is an "innovative approach to education delivery via electronic forms of information that enhance the learner's knowledge, skills, or other performance" (Bhuasiri *et al.*, 2012). The eLearning platform supports the users to gain diverse types of knowledge from online content (Qwaider, 2011). As a part of the massive globalization process, higher education experiences the dynamic reshaping in the form of virtual institutions. However, the accountability movement in higher education (Connolly *et al.*, 2005), failure of many eLearning projects (Masoumi and Lindström, 2012), and the commercialization of these eLearning systems (Alkhattabi *et al.*, 2011) have amplified concerns about eLearning quality, more so in online-published content quality evaluation (Alkhattabi *et al.*, 2011). Organizations have invested heavily on eLearning – the coolest technology, "the most bells and whistles" (Zelihic and Reed, 2014) with more emphasis on "e," i.e. electronic or technology. "Learning" left alone, faces negligence by organizations and researchers. Enhancing and assuring quality is a core demand

and a need for the success of higher education institutions practicing eLearning (Masoumi and Lindström, 2012), and to increase organization efficiency and capability (Yoo *et al.*, 2011).

2. Problem statement

The main concern of the study is the elusive use of data quality (DQ) and information quality (IQ) dimensions to measure knowledge quality (KQ). Most of the researchers do not attempt to provide a clear definition of KQ or fail to explore the factors associated with KQ distinctly and do not conceptualize the construct. Thus, they make the mistake of using IQ dimensions to measure KQ without any justification (Halawi *et al.*, 2007; Jennex and Olfman, 2006; Liu *et al.*, 2010). Attempting to overcome this issue, Waheed and Kaur (2014) conceptualized and operationalized the KQ based on the theory of knowledge and knowledge hierarchy. They presented 26 KQ dimensions uniquely associated with KQ construct. These dimensions are: accuracy, consistency, innovativeness, objectivity, reliable, reputation, updated, usefulness, believable, true, justified, appropriate amount of data, complete, current, level of detail, relevant, timeliness, value added, concise representation, consistent representation, interpretability, understandability, accessible, adaptable, applicable, and expandable. However, the study lacked construct validation. As Creswell and Clark (2010) suggested, to assess any new phenomenon and to propose its operational measures it is indispensable to analyze the grounded data. Therefore, it is required to explore the dimensions relevant to KQ conceptualization.

Prior researchers have given limited attention to investigate learning in terms of knowledge gained from the eLearning content. Their major focus was on evaluating the quality of eLearning systems (Zhao, 2003; Masoumi and Lindström, 2012), IQ in online-published content (Alkhattabi *et al.*, 2011; Cheng, 2012), and role of information, knowledge, service, and system quality in eLearning blog success (Wang *et al.*, 2014). In an educational setting, it is essential to assess KQ of online content as students are more concerned about content quality (Rodríguez-Ardura and Meseguer-Artola, 2014) that promotes deep and meaningful learning through the knowledge gained. Thus, it is necessary to understand the student's perception of what constitutes KQ in an eLearning environment.

This study acknowledges Waheed and Kaur's (2014) effort and answers their call for dimensions' validation by utilizing a qualitative approach to validate the suggested KQ dimensions and affirm new factors, if any.

In light of the above explanation of the gap in the literature, the objective of this study is to explore the KQ dimensions from student's perspective in the eLearning context. Students' perception about the content available in eLearning environment (mentioned in the methodology) is taken into account, because students are the main beneficiary of an institutional eLearning environment and they can best judge the quality of knowledge gained from the online content. As Wang and Strong (1996) suggested to consider the consumers' perspective to judge the quality and in educational setting students are the main consumers of education (Marginson, 2013). Therefore, perception of students' best fit with the purpose of this study.

The following research question has guided this exploratory study by employing the qualitative methodology to address the need to conduct a context-based study on KQ:

RQ1. What do online students perceive to be the dimensions of KQ in eLearning context?

3. Definitions of key concepts

To fulfill the aim of the study and to set the stage for the method and results, it is first required to define KQ. The "quality" literature has widely adopted the "fit for use" concept to judge the quality of data and information. It emphasizes on user's perspective of quality and their judgment about its fitness for use (Wang and Strong, 1996). This research also considers the user's judgment about content fitness for use. Additionally, the conceptualization of KQ construct (Waheed and Kaur, 2014) is taken into account while defining KQ in the eLearning context. Following these baselines, KQ is defined as: "Knowledge gained from content that is fit for use, accessible, and actionable to the online user." In an attempt to measure the defined phenomena, certain attributes need to be identified on an individual basis to quantify its measurement. As per the definition of "DQ Dimensions" (Wang and Strong, 1996), we adapted and define the "KQ Dimensions" as "a set of KQ attributes that represent a single aspect or construct of eLearning KQ."

4. Literature review

Researchers are more inclined toward KQ measurement in knowledge management system (KMS) and knowledge sharing context, thus, neglecting the eLearning context. Jennex and Olfman (2006) performed a content analysis and measured the KQ of KMS by assessing the dimensions adapted from Delone and Mclean (2003) IQ dimensions namely: strategy/process, richness, and linkages between knowledge components. Chiu *et al.* (2006) identified 310 virtual communities' members' judgment about quality of shared knowledge (KQ) in virtual communities by assessing McKinney *et al.*'s (2002) IQ dimensions. Meanwhile, Halawi *et al.* (2007) assessed KQ while investigating the KMS success and reported 99 employees' perception about quality of knowledge by using 11 quality indicators: convenience of access, accuracy, timeliness, precision, reliability, currency, completeness, volume of output, relevancy, and error recovery, adapted from Bailey and Pearson's (1983) IQ dimensions. In another study, Kulkarni *et al.* (2007) investigated the role of knowledge content quality in knowledge management success and their findings show that managers focus on presentation format and usefulness of the content when judging the knowledge content quality, again Bailey and Pearson's (1983) IQ dimensions are utilized. In Rao and Osei-Bryson's (2007) discussion of the dimensions to measure quality of knowledge items (content) within the system, eight indicators were described: accuracy, consistency, currency, data interpretability, degree of context, degree of relevance, degree of detail, and usefulness.

Chan *et al.* (2008) found that the knowledge acquired by employees from the listed sources is useful and innovative for them, thus confirmed the quality of knowledge that influences firm performance. Similarly, Liu *et al.* (2010) confirmed relevance, ease of understanding, accuracy, completeness, reliability, and timeliness as key indicators of KQ in libraries, using McKinney *et al.*'s (2002) IQ dimensions. Yoo *et al.* (2011) elaborated the concept of KQ in the context of project teams' environment by identifying 13 quality indicators under three major dimensions to measure KQ: first, intrinsic KQ (accuracy, reliable, objective, unbiased, believable, current, updated), second, contextual KQ (adds value, relevant, appropriate, context-specific), and finally, actionable KQ (actionable, adaptable, expandable). More recently, Valaei *et al.* (2013) discussed the influence of KQ on SMEs competitiveness and utilized four KQ dimensions (intrinsic KQ, contextual KQ, actionable KQ, and accessibility KQ). Waheed and Kaur (2014) analyzed 33 works relating to various studies for measuring DQ, IQ, and KQ, with the purpose of understanding how these construct were being

conceptualized and measured empirically (see Table I). They conclude that researchers are repeatedly using DQ and IQ dimensions to measure KQ.

In research relating to eLearning, a number of researchers have reported numerous measures for the eLearning environment. Various dimensions are quantified to measure the eLearning quality; such as, tutor support, communication in courses, technology, cost-expectation-value, information transparency, course structure, and didactics (Ehlers, 2004). Likewise, researchers measured the eLearning course quality by assessing; structure, content, delivery, service, and outcomes (MacDonald and Thompson, 2005), consistent course design, student-to-student interaction, timely interaction, amount of content, technical support (Young and Norgard, 2006), supportive, pedagogical, and environmental domains from Asian students' perspective (Jung, 2012). Similarly, Ginns and Ellis (2007) evaluated the eLearning quality indicators by looking at students' approach to judge good e-Teaching, good e-Resources, appropriate workload, and student interaction. In another study, Alkhattabi *et al.* (2011) reported 14 dimensions under three categories: intrinsic (objectivity, accuracy, believability), accessibility (availability, relevancy, accessibility, and response time), and contextual representation (conciseness, verifiability, representation consistency, understandability, amount of information, reputation, and completeness) to assess the IQ of the eLearning content available in an online portal. These researches report on eLearning quality and dimensions of IQ. However, assessment of content quality has received limited attention; specifically the quality of knowledge gained from the online content is not discussed in the literature.

The above discussion on KQ dimensions' usage highlights the gap in KQ conceptualization and measurement. Adoption of McKinney *et al.* (2002), Delone and Mclean (2003), or Bailey and Pearson (1983) IQ dimensions to measure KQ is not justifiable, because based on knowledge hierarchy (Rowley, 2007; Waheed and Kaur, 2014) IQ and KQ are linked, but still hold their distinct position in the hierarchy. Therefore, it is admissible to use the IQ dimensions for KQ measurement, but with other distinct dimensions associated with KQ only.

It is concluded that the assessment of KQ quality relating to content in eLearning environment is an important area of research and the students' perspective, as the key consumers, need to be judged. Students' main concern is with the extent to which the online content is providing quality knowledge, particularly in educational setting. Studies lack in reporting the factors that are playing a key role to judge eLearning KQ from students' perspective.

Therefore, this study addresses this research gap and explores whether KQ key measurement dimensions are distinct from IQ dimensions. Also, how KQ can be measured from student's perspective by employing qualitative data gathering technique.

5. Methodology
Qualitative methodology is popularly used in research to present a phenomenon which is not defined or known for the target population (Creswell and Clark, 2007). Hence, considering that KQ in an eLearning environment as a not well-defined phenomenon, and the need to develop a measurement instrument for the construct, this study adopts the qualitative method. Unstructured open-ended questionnaires were used for data collection that helps the participants to provide answers in their own words (Jansen, 2009).

Citations in relevant area	Ac	Be	Consis	Un	Rel	Rep	Up	Use	Ap	Com	Cur	Det	Relv	Ti	Val	Ver	Consic	Int	RepCon	Und	AccSec	Acc
DQ																						
Wand and Wang (1996)	X	X								X			X	X	X		X	X	X	X	X	X
Strong et al. (1997b)	X	X				X				X			X	X	X		X	X	X	X	X	X
Redman (1998)	X		X							X							X	X	X	X	X	
Pipino et al. (2002)	X	X	X	X		X			X	X	X		X	X	X		X	X	X	X	X	X
Liaw et al. (2013)	X		X		X			X		X							X					
IQ																						
Strong et al. (1997a)	X	X				X			X	X			X	X	X		X	X	X	X	X	X
Raghunathan (1999)	X											X	X	X								
Lee et al. (2002)	X	X		X		X			X	X			X	X			X	X	X	X		X
Kahn et al. (2002)	X	X		X		X			X	X			X	X	X		X	X	X	X	X	X
Rai et al. (2002)	X							X	X	X					X				X			
Bovee et al. (2003)	X		X							X			X				X			X		X
Delone and Mclean (2003)	X		X		X					X	X		X	X					X	X		
Delone and Mclean (2004)	X									X	X		X						X	X	X	
Nelson et al. (2005)	X								X	X	X						X					X
Knight and Burn (2005)	X						X			X	X		X	X					X		X	
Roca et al. (2006)	X				X		X			X			X	X			X			X		X
Herrera-Viedma et al. (2006)		X					X						X	X			X	X	X	X		X
Petter et al. (2008)								X									X					
Stvilia et al. (2008)	X		X					X		X			X			X	X	X	X	X		X
Gorla et al. (2010)	X		X							X			X				X	X	X	X		
Masoumi and Lindström (2012)	X			X		X																
Kim et al. (2012)	X		X							X			X	X			X		X	X		X
eL IQ																						
Alkhattabi et al. (2010)	X	X		X		X			X	X			X			X	X		X	X		X
Alkhattabi et al. (2011)	X	X		X		X			X	X			X			X	X		X	X		X
KQ																						
Chiu et al. (2006)	X						X			X			X	X						X		
Jennex and Olfman (2006)	X					X	X			X	X		X	X						X		
Rao and Osei-Bryson (2007)	X		X		X	X	X			X	X	X	X	X			X			X		
Halawi et al. (2007)	X				X	X							X	X								X
Liu et al. (2010)	X									X			X							X		

Notes: X, shows that studies (mentioned in second column at left) have used the variables (mentioned in first row); DQ, data quality; IQ, information quality; KQ, knowledge quality; eL, eLearning; Ac, accuracy; Be, believability; Consis, consistency; Un, unbiased; Rel, reliability; Rep, reputation; Up, updated; Use, useful; App, appropriate amount of data; Com, completeness; Cur, current; Det, level of detail; Relv, relevancy; Ti, timeliness; Val, value added; Ver, verifiability; Consic, conciseness; Int, interpretability; RepCon, representation consistency; Und, understandability; AccSec, access security; Acc, accessibility
Source: Waheed and Kaur (2014)

Table I.
DQ, IQ, KQ
comparison matrix

5.1 Participants

Participants' selection is an important task for qualitative data collection and requires information rich participants (Creswell and Clark, 2007). To explore the students' perspective about quality of knowledge gained from eLearning content, students who use eLearning environment in their class rooms for different activities like discussions, chats, lecture notes, etc. are information rich participants. They can better judge the content quality which helps them to gain knowledge.

Hence, students who actively use online portal in their class rooms, specifically, undergraduates and postgraduates (by coursework) were selected from a single largest government university in the state of Kuala Lumpur, Malaysia. This university has implemented Student Powered e-Collaboration Transforming UM (SPECTRUM) using modular object-oriented dynamic learning environment as the eLearning platform that facilitates students with a secure and personalized eLearning environment. The single university selection was based on the fact that; first, administrative, technical, and organizational facilities may influence the quality of the content uploaded, second, students can use SPECTRUM without any institutional boundary restriction, and finally, every coursework student is required to use SPECTRUM.

This study utilizes purposive sampling to identify students from two faculties, namely: Faculty of Computer Science and Information Technology and Faculty of Language and Linguistics. Therefore, to reduce the response biasness two different faculties are selected purposively on science and non-science bases. This method is also suggested in the literature as a suitable sampling approach for qualitative research (Tashakkori and Teddlie, 2010).

5.2 Data collection

Online students were selected considering the aspect of information rich participants. However, students' consent was taken into account before data collection and they were briefed about the purpose of the study and the confidentiality of their responses due to ethical concerns. The open-ended unstructured questionnaires were distributed among 70 students who had voluntarily accepted to participate in the survey. This activity was carried out between the month of November and December 2013. Along with the cover letter explaining the study's purpose, briefing sessions were organized to explain the type of information needed and criteria to answer the questions. To avoid response biasness and to identify more underlying KQ dimensions from students' perspective, they participants were not asked directly about their opinion on KQ as a construct, but rather they were encouraged to respond based on their eLearning experiences. Continuous contact with the participants through personal visits and mobile messages was maintained throughout the data collection process for any further questions, or elaborations as suggested by Bolger *et al.* (2003), to avoid the misunderstanding and to receive useful responses. Participants were asked about:

(1) their perception about online content when using SPECTRUM for the first time;

(2) aspects lacking in online content and problem faced by student while using it;

(3) how they ascertain the content authenticity;

(4) how the content fulfills their requirements;

(5) how is the presentation of the online content; and

(6) for what purpose they use it.

Each participant was given one week to return the completed open-ended questionnaire to the assigned person in their class. Receiving an initial low response rate, gentle reminder messages, and e-mails were sent regularly for four to five weeks, till a desired response saturation and no new information was being presented in the responses. A total of 52 (74 percent) participants returned the open-ended questionnaires, of which 29 (55 percent male, 45 percent female) were from Faculty of Computer Science and Information Technology and the other 23 (39 percent male, 61 percent female) from Faculty of Language and Linguistics.

5.3 Coding

Only complete open-ended questionnaires was selected as unit of analysis (Zhang *et al.*, 2004; Graneheim and Lundman, 2004) to understand the whole phenomena (Elo and Kyngäs, 2008) and get familiarity with it (Polit and Beck, 2004). Statements in paragraphs were considered as coding or meaning unit (Graneheim and Lundman, 2004) to have an idea about the theme. Table II presents a sample of the coding and categorizes the meaning.

A total 193 useable statements from each open-ended questionnaire were retyped in the participants' own words. The statements representing similar meanings were assigned to a single sub-dimension and these sub-dimensions were labeled based on their visibility in the literature, thus maintaining some level of uniformity. Considering counting as a useful moderator of research bias (Creswell and Clark, 2010), priority was given to dimensions showing higher frequencies. The resulting 34 dimensions with 193 statements were reviewed by three field experts in curriculum and instructional technology (local), philosophy, and information management (international) to rate the relevance of each statement at three levels; week = 1, moderate = 2, strong = 3 and to comment on the naming format. The final 34 sub-dimensions were categorized under five major dimensions considering the nature and definition of the dimensions. The participants' perception and researcher's interpretation of each sub-dimension is detailed in the next section.

Respondents ID	Meaning unit	Sub-dimensions
ENG-Q3-Res1	To determine how accurate the content is I compare it with other sources	Accurate
FKT-Q7-Res5	Content is correct and accurate	
FKT-Q3-Res3	The information provided is accurate	
FKT-Q3-Res2	Correct course manual can ensure the correctness of the online content	
FKT-Q5-Res10	Contents in the online portal need to be rearrange	Consistent
FKT-Q3-Res1	Sometimes lectures upload very different articles for same topic	
FKT-Q1-Res1	Lecturer put up new and current links from YouTube	Innovative
FKT-Q7-Res1	To check new contents or announcements in the forums and message modules	
FKT-Q6-Res6	Each lecturer has specific course in online portal to handle and they put equal and relevant amount of information in each section by themselves	Unbiased
FKT-Q2-Res1	Customization of contents for each course is important	
ENG-Q3-Res5	Similar information is available on other websites or online articles about the content I want to search	Reliable

Table II.
Coding and categorizing the meaning unit

6. Results

This section explains the results of the open-ended questionnaires and labels the meaning units (statements) according to their appearance in the literature (if any) or with a term that best describes the characteristic.

The purpose of the study has driven this qualitative analysis, which is to identify online students' perspective about underlying dimensions of eLearning KQ. Each theme that emerged is discussed below:

(1) *Accurate:* Rao and Osei-Bryson (2007) explains accuracy as when there are a number of people supporting the correctness of knowledge used and have the exact answer to questions asked. Students expect the use of correct content for educational purpose because it builds their idea and knowledge about the topic. Erroneous or incorrect content negatively influence the student's understanding and educational performance:

> "The content should be correct because it's on educational portal" (Res9), "Sometimes we encounter problems in terms of content correctness, which makes problem in making our assignments" (Res10), "The information provided is accurate" (Res3).

The discussion above show that errorless, correct, and accurate content is needed to ensure quality of knowledge gained from an eLearning environment.

(2) *Consistent*: content consistency is considered as an important aspect in the literature (Rao and Osei-Bryson, 2007) and is also confirmed in this study. Different types of content and their inconsistency with other uploaded material for a particular week or topic is troublesome for the student. Student commented about content disarrangment as:

> "Contents in the online portal need to be rearrange" (Res10), "Sometimes lectures upload very different articles for same topic, it puts me in trouble that which one I have to choose" (Res1).

This discussion show that the students expect arranged and consistent content to be uploaded on eLearning environment that helps in clear and easy understanding of the topic.

(3) *Innovative*: Soo *et al.* (2004) referred to the concept of KQ as "the acquisition of useful and innovative knowledge." An analysis of the statements revealed that the students visit eLearning environment to find new content which can help them for their projects. As a student reported that:

> "I feel more knowledgeable when lecturer put up links of novel studies from YouTube, this is interesting and useful" (Res1), "For my projects and assignments I check new contents or announcements in the forums and message modules" (Res1).

The content with new information provides ample chances to get quality knowledge.

(4) *Unbiased*: unbiased content is explained as the equal distribution of required content for a specific topic and confirmed as an important determinant of quality content in eLearning environment (Alkhattabi *et al.*, 2011). Each topic in the course should be given equal weightage, a student relates it with the content customization and says that:

> "Sometimes in one week teacher gives lot of articles to study for one topic but then no other articles or links for next week class lecture (Res7), "Customization of contents for each course is important, it can give us equal amount of knowledge every week" (Res1).

The importance of un-biasness of content in terms of its equal proportion for each topic is an indicator for quality.

(5) *Reliable*: reliability was one of the most stated aspects by students when judging eLearning KQ. The following statements show the students' concern and satisfaction about content reliability and this is ensured through cross-referencing or discussion forums:

> "I have to read from different sources and constantly doing cross-reference to make sure the online content is reliable" (Res4), "I bring up some information that I found in the online content to be discussed in class, with my friends or lecturers. Through their response and feedback, I am able to evaluate the reliability of the online content" (Res4), "Most of the content uploaded by lecturers on spectrum are reliable" (Res3).

These statements are in accordance with the previous literature which discusses the need for reliable information (Bailey and Pearson, 1983; McKinney *et al.*, 2002; Nelson *et al.*, 2005) as a characteristic of quality.

(6) *Reputed*: content cited by many authors holds good reputation and can be searched easily due to its high ranking (Alkhattabi *et al.*, 2011) while searched using related terms. This aspect is revealed from student statements like:

> "Content need to be cited by many authors, as a sign that many users have use the article" (Res10), "Display of online content depends on the high citation of the content" (Res7), "We can find needed materials easily and quickly at the first page of the google search" (Res6), "I need reputable contents for my essays or presentation" (Res2).

It shows that the content reputation is considered as an important aspect and required for quality knowledge.

(7) *Updated*: students appreciated the up-to-date online content which improves quality knowledge gained as compare to printed books. They reported that:

> "Found most updated resources rather than in books and published materials in hard copies" (Res9), "I find every up-to-date information via online content" (Res6).

The updated online content keeps the students informed about new resources that play a key role in building a student's quality knowledge repository.

(8) *Useful*: the content used in building new resources is considered as useful (Chan *et al.*, 2008; Davis, 1989; Seddon and Kiew, 2007). This aspect is acknowledged by many students in their statements and they consider the online content as useful learning material:

> "I think online content does a lot for me when I do my assignments" (Res1), "The most important thing I am looking for is the usefulness of the information for my projects" (Res4), "Most of the online information is useful especially articles from databases" (Res1).

Thus, "usefulness" is considered a measure for eLearning KQ.

(9) *Believable*: in order to believe the content it is important that it has some credibility. Various researchers consider believability in terms of its credibility (Fogg and Tseng, 1999; Kahn *et al.*, 2002; Pipino *et al.*, 2002; Wathen and Burkell, 2002). Students discussed the content credibility as:

> We can't be sure and that all the content is credible, it's better to compare it with other sources (Res1).

Another student mentioned the reliable source as a condition for content credibility and stated that:

> Since this comes from reliable source, so it shows the credibility (Res11).

Student builds a sense of believing the content if they are sure about its credibility.

(10) *Trustworthy*: truthfulness or trustworthiness of content is an essential attribute of knowledge (Lehrer and Paxson, 1969) that presents the quality of knowledge. Most of the students believe the contents truthiness without any doubt. This is because of their trust on the authority that has uploaded the content:

> "The content is 100% correct because person with authorization can only upload those contents" (Res6), "It was uploaded by one of our lecturer and purposely for you means it should be truthful" (Res8), "Instructor put the content on the website so they must be trustworthy" (Res5).

The above statements show that students are aware of content truthfulness in eLearning environment and it is important to build a quality knowledge.

(11) *Justified*: authenticity of the content can be justified through any valid resource with good reputation. A number of students confirmed the presence of content authenticated source by citing the renowned publishers, databases, and name of big giants in the particular field as a source of justification:

> "The justification of the chosen online content is also important, For example, content from JSTOR, Project Muse, ProQuest is definitely reliable then some random entries on the internet" (Res2), "I will see who the party is providing such content, so then we can found the authenticity of the online content easily" (Res5), "I reconfirm the content with other reputable and legit resources" (Res2), "I think the content uploaded on the portal is trustworthy because it is mostly from published papers and journals" (Res4), "I would usually justify its reliability by verifying its authors" (Res1).

The above statements shows that the students look for content authenticity and if they are able to justify its authentication, then they are actually gaining quality knowledge. This assures the importance of justified content in order to build quality knowledge.

(12) *Available*: the availability of content was also one of the key concerns of the students. The cost and subscription issues increase student frustration and they may look for lower quality resources freely available online, which in return may reduce the quality learning and knowledge gain:

> "My only wish would be that content should be made available for all the topics (Res3), "Sometimes materials are not that easy to find, you have to subscribe or pay certain amount of fee" (Res6).

The provision of full text articles or reference materials by teachers ensures the quality content availability in eLearning environment and it serves as a key indicator of eLearning KQ measurement.

(13) *Concise*: content conciseness concept is related to content itself instead of its representation and is explained as "giving a lot of information clearly and in a few words; brief but comprehensive" (Oxford Dictionary, 2010). Students explained this aspect as:

> Information from diverse sources should be in uniform and brief way (Res7).

Useless and redundant information in lengthy content raise understandability problem that reduce the student's reading and learning interest:

> Unfortunately, most of the contents are too long in length to be studied completely, so we have to search and find other articles shorter in length and with the summary (Res5).

The statements show the importance of concise content in the eLearning environment and its influence on student's knowledge.

(14) *Appropriate*: the content which is appropriate with sufficient amount of information own its quality (Kahn *et al.*, 2002). Number of students explained this aspect:

> Online content is enough and helpful to fulfil the requirements for projects (Res6).

Insufficiency of content and demand for other resources was also reported by few students:

> "Contents are not fully uploaded on the spectrum" (Res5), "Fulfils the basic of class activity but for assignments and research more additional resources are needed" (Res8).

Hence the statements above present the importance of appropriate amount of data.

(15) *Complete*: content with missing information is not useful at all (Pipino *et al.*, 2002). Students' statements about content available in eLearning environment revealed this aspect as:

> "Content are not complete on the spectrum" (Res5), "The lecturer looks for and upload the content which is appropriate enough" (Res3).

This shows the importance of completeness of a content provided to students for their study that can build positive and negative perception which may influence their quality knowledge gain.

(16) *Current*: the content entry or the time of uploading it in the eLearning environment shows its level of currency (Jarke *et al.*, 1999; Rao and Osei-Bryson, 2007). The more current the content the more it will be useful. The students explained the aspect as:

> "The online content allows me to have more current information" (Res7), "There is lacking of updating the information on the portal, it is not current content" (Res3).

It shows the students' positive and negative perception about eLearning content and confirms the importance of current content.

(17) *Level of detail*: content with enough coverage relevant to a topic (McKinney *et al.*, 2002) and its ability to perform further tasks shows its level of detail. A number of students mentioned this aspect, while few expressed their satisfaction with the provided content as compared to negative perception:

> "Very effective and provide enough detail" (Res7), "Teacher gives us an introduction to the course topics and for further information and details we have to search through other portals and website" (Res5), "The contents uploaded by the lecturers were usually basic course info we needed to get for ourselves the rest" (Res4).

The statements above show the importance of content's level of detail as a KQ indicator.

(18) *Relevant*: the degree of information required and provided confirms its level of relevancy (Bailey and Pearson, 1983). A number of students' statements assures this concept:

> "Any content uploaded should be related with academic needs" (Res10), "Lecturers upload the documents which are related to the course" (Res6), "We can see the material that is relevant to our topic" (Res1).

The statements above show the importance of content relevance among students as they evaluate it.

(19) *Timeliness*: information which is in-time has its worth and quality (Bovee *et al.*, 2003):

> "The information provided is timely" (Res3), "Some lecturers don't even give the time to upload the content on class dates on portal" (Res1).

The above positive and negative statements about content timeliness confirm its existence as an important aspect of KQ.

(20) *Value added*: information which improves an individual's understanding and gives benefits from its use is considered as value added information (Kahn *et al.*, 2002; Nelson *et al.*, 2005). Student's consider this factor and state that:

> "Online content so far helped me so much for my assignments and projects, it facilitate my understanding" (Res5), "I think the LMS is currently adds enough to my knowledge in terms of contents and interactions (student to students/student to lecturer)" (Res1).

Students remarks, presents the importance of "value added" dimension in KQ measurement.

(21) *Convenient to find*: convenience or ease in finding the required content from any system leads to satisfaction, learning and knowledge gain and diminishes the effect of frustration in other case:

> "It is difficult to find the information that I want on the portal" (Res4), "I feel so convenient while finding the content for my use on portal" (Res2).

The above statements present the students' concerns about convenience in finding the required content from eLearning environment.

(22) *Secure*: the secure learning environment with separate login for every registered student and assigned teacher improves quality of the overall environment. Students confirmed the eLearning environment security and stated that:

> "Spectrum has login system so it is highly secure, No stranger allowed" (Res6), "Online portal security avoids unnecessary uploading which gives only relevant and quality material" (Res7).

Hence, it is important to consider the security of the system in order to improve the content quality and knowledge gained from it.

(23) *Concise representation*: unlike content conciseness (Oxford Dictionary, 2010), concise representation refers to the compact content. Students consider this aspect of eLearning environment and said that:

"Online content representation and design is compact" (Res2), "The content in the forums is really not compact and well presented for the students" (Res1), "It is not customized as it can be" (Res1).

The statements show the existence of this aspect in student's perspective to build quality knowledge.

(24) *Consistent representation*: the consistency and uniformity of content is very important for quality learning (Liaw *et al.*, 2013). Students reported this aspect as:

"They (contents) are classified into categories; it helps in easy and quick understanding of the content" (Res5), "it's very consistent" (Res9), "Lecturers don't put material week wise, it's confusing mostly" (Res3), "Different lecturers use different methods in uploading their resources online" (Res8).

Hence it is required to understand the influence of representation consistency on student's knowledge gain.

(25) *Interpretable*: the content which is well described (Jarke *et al.*, 1999) encompasses good interpretability which is essential for student learning. The clear interpretation using diagrams, tutorials or interactive materials improves student's understanding:

"Some contents are difficult enough that first we have to Google them to understand its purpose" (Res5), "If the content include the tutorial or any interactive material like videos then it would be good" (Res5), "The design is ok but if there should be some interactive things" (Res3).

The clearer the interpretation, the higher will be the understanding and knowledge gained, hence, it is required to consider this aspect to measure eLearning KQ.

(26) *Understandable*: easily comprehended information holds the quality (Wang and Strong, 1996). Content understandability is considered as an important factor by students and they reported mixed comments regarding understandability of available content:

"I think the content is interesting and it is easy to understand" (Res5), "It is difficult to understand uploaded content" (Res8).

The understandability leads to good learning and quality knowledge gain.

(27) *Stable representation*: the frequent changes in the design of the eLearning environment are troublesome for students:

Every time there is no specific way or method of downloading content from spectrum, sometimes it automatically download the file for several times which is very irritating and waste my time (Res8).

The content availability at same place throughout the semester is also important:

The information disappears later even though the lecturers had uploaded them earlier (Res4).

This shows that the students prefer fewer changes in interface design for better understanding of the particular topic.

(28) *Attractive*: attractive representation motivates the individual to engage with eLearning environment for a longer duration:

> "Use of photographs or images related to required content on the portal effect on the user rapid use" (Res4), "If there are some colours with some diagrams and flowcharts then it's more attractive" (Res3).

The statements above present the importance of attractiveness and its measurement in eLearning KQ context.

(29) *Accessible*: the autonomy of content accessibility at anytime and anyplace is a source of encouragement for students:

> "Been able to access your lecture notes, assignments etc. from your room its impressive" (Res8), "Spectrum is good but sometimes it is hard to access the content" (Res1), "There is limited access to so many relevant resources when I am not in campus" (Res2).

The above statements present the importance of easy accessibility as KQ measurement.

(30) *Technical accessibility*: to get the required content, in-campus or off-campus, technical hurdles may raise accessibility problem. A number of students discussed this aspect as:

> "Sometimes system is down & as a user we cannot do anything to access that" (Res9), "Sometimes the link to the contents are broken and we cannot download them, and we have to search of other information on Google which is not uploaded by my teacher and I am not confirm that it is correct or not. […] ahhh." (Res5).

The above statements explain the importance of measuring technical accessibility quality in eLearning environment.

(31) *Network strength*: network strength is important to access the big size documents, e.g. financial data, graphical charts, and eBooks that mostly holds quality content. As many students reports that:

> "If the speed of internet is good then I can easily find the material" (Res2), "Accessing related material depends on the stability and good network" (Res2), "It is troublesome to access the contents when the size of the content is large and it will be difficult to lead in a short time because of internet connection" (Res1).

These statements show the importance of good internet as essential indicator to measure accessible KQ.

(32) *Adaptable*: adaptability in terms of content use for assignments and various learning activities and presentation is frequently reported by students:

> "I use the uploaded content as my reference and work cited for my writing assignments and for presentations" (Res4), "Definitely, I use the uploaded content for doing my assignments" (Res2), "I use them mostly for class activities and examination" (Res8).

The statements show students eLearning content adaptability for various purposes. Hence it shows the importance of measuring content adaptability to measure the eLearning KQ.

(33) *Applicable*: the content applicability for various tasks explains its actionable nature that is key aspect of quality knowledge (Yoo *et al.*, 2011). Number of students mentioned the applicability of content as:

"I can apply the contents uploaded on the spectrum for class discussions that we read before the class" (Res5), "Some of the contents are for reading before the class and also to communicate with lecturers and course mates" (Res1), "Helps in participating in forums when necessary" (Res1).

The above statements ensure the content applicability as an important indicator to measure KQ.

(34) *Expandable*: the content which gives further insight and triggers more innovative ideas, holds the expandable nature, which is considered as an important indicator of KQ (Yoo *et al.*, 2011). In research perspective, content used for literature review gives new insight or knowledge about the topic under study. Students reported this aspect various times as:

"Sometimes I also look for ideas and inspiration from online content to gain some insights on the topic I am working on" (Res2), "I use the content for my own knowledge on topics that interests me (Res3), "I use the content to review literature for research article" (Res9).

The statements above confirmed the expandable nature of the available content and should be considered as important aspect of eLearning KQ.

7. Abstraction
Qualitative analysis confirmed the existing 26 dimensions from exploratory literature and revealed eight new dimensions. The categorization of identified dimensions helps in interpretation and judging the results (Wang and Strong, 1996). Framing the research topic's general description by generating specific categories is termed as abstraction (Elo and Kyngäs (2008). Considering the conceptualization of KQ by Waheed and Kaur (2014), conceptual categorization method was employed for abstraction of the identified 34 dimensions, instead of an empirical method. Wang and Strong (1996) categorization of DQ dimensions is acknowledged in this study and four categories: "Intrinsic KQ," "Contextual KQ," "Representation KQ," and "Accessible KQ," and "Actionable KQ" are proposed here to relate the actionable nature of knowledge. The 34 dimensions were linked with respective categories based on their nature and definition. Table III shows the five dimensions and their underlying 34 sub-dimensions with their description identified through qualitative analysis.

7.1 Intrinsic KQ
Intrinsic means essential and Yoo (2012) define intrinsic KQ as "the extent to which knowledge has quality in its own right." In current study perspective, the content which intrinsically contributes toward quality knowledge explains the aspect of intrinsic KQ. Hence, it is referred to as "The extent to which the content has quality in its own right to help in quality knowledge gain." The sub-dimensions which hold the intrinsic nature to help in quality knowledge gain are grouped under intrinsic KQ and tabulated in Table III.

7.2 Contextual KQ
Context is important to fully understand the knowledge of the task in hand (Nonaka, 1994; Nonaka and Takeuchi, 1995) and contextual KQ is dependent on users' context.

Dimensions	Sub-dimensions	Description
Intrinsic KQ: the extent to which the content has quality in its own right to help in quality knowledge gain	Accurate	Accurate, correct, content correctness, correct information
	Consistent	Content need to be rearranged, different articles for same topic
	Innovative	New content, new announcements, novel
	Unbiased	Objectivity, equal information in each section, content customization
	Reliable	Similar information on other website, reliable source, cross-references, reliable content
	Reputed	Google lead me easily to article, reputable content, quite easy to find on internet, cited by authors, display of content, content used by how many people, who has uploaded the content
	Updated	Updated resources, latest information
	Useful	Useful, information is useful, content does a lot for me, usefulness of information, useful for discussion, very useful
	Believable	Sure that content is correct, from reliable source so its correct, credibility of online content
	Trustworthy	True, authenticity, 100% correct, trustworthy, uploaded by lecturer so correct, authorized person can upload only
	Justified	Published papers and journals, source of online content, reading the review, content with other reputable and legit resources, verifying its authors, content from Jstor, Project Muse, ProQuest, cross check with other sources, registered online databases, internationally recognized, authenticity of online content, internationally recognized, party providing the content
	Available[a]	Made available, content is available
	Concise[a]	Contents are too long, diverse sources
Contextual KQ: the extent to which content is considered within the context of the task at hand to help in quality knowledge gain	Appropriate amount	Contents are not fully uploaded, fulfilling my requirements, resources were substantial, fulfills basic class activity, more resources needed, enough documents, content is enough, additional contents can be provided
	Complete	Not complete, appropriate enough, complete itself
	Current	Current information, lacking in current content
	Level of detail	Search for other detail, better if content refer to seminal text, only basic reading, only basic course info, student search themselves for more references, contain content, provide enough detail
	Relevant	Mostly about the subject, relevant for me or not, related with academic need, represent my demands, related to the course, relevant to our topic, relevant websites
	Timeliness	Timely information, upload content in-time, lecture notes on-time
	Value added	Facilitate my understanding, adds enough
	Convenient to find[a]	User-friendly searching, search flexibility, difficult to find, easy synchronize my files, get the desired information, so convenient, easily find the content
	Secure[a]	Highly secure, provide security

(continued)

Dimensions	Sub-dimensions	Description
Representational KQ: the extent to which the content holds the quality representation to help in quality knowledge gain	Concise representation	Organized well, not really comprehensive, not customized
	Consistent representation	Classified into categories, presentation is quite confusing, do not put material week wise, comprehensive style, presentation need to be rearranged, different style of presentation
	Interpretable	Contents are difficult enough, illustrations helps to enlighten us
	Understandable	Difficult to understand, easy to understand
	Stable representation[a]	Information might disappear, design keeps changing
	Attractive[a]	Eye catching and attractive, well presented, attractive, design in appreciable, presentable, basic and uninteresting, attract the intention
Accessible KQ: the extent to which the content is easily available and quickly retrievable to help in quality knowledge gain	Accessible	Quite accessible, easily accessible, unable to access, limited access, accessed online, inaccessible, able to access, access documents, easy to be accessed, do not have to leave my home
	Technical accessibility[a]	Cannot access because of maintenance, technical problem, network is efficient, system is down, broken links
	Network strength[a]	Content access depends on good internet, speed of internet, internet connection, connection with the internet, stability, and good internet
Actionable KQ: the extent to which content is expandable, adaptable, or easily applied to tasks to help in quality knowledge gain	Adaptable	Content for class discussion, content to do preparation before class, research for my assignments, reading before the class, contents to communicate with mates, content is used when chat with lecturer, helps in forum participation, helps in answering quizzes
	Applicable	Useful for further reading, improve my own knowledge, inspiration from online content, good ideas, helps in literature review, use for further research, review lecture notes
	Expandable	Use as my reference, work cited for my work, content to substantiate my arguments, complete assignments using lecture notes, use them for class activities, utilize the content, use for assignments, doing my assignments, use in online tests

Table III.

Note: [a]Dimensions emerged after open-ended questionnaire

Yoo (2012) define the contextual KQ as "the extent to which knowledge is considered within the context of the task at hand." In this study's context, quality of the eLearning content to help in quality knowledge gain should be measured based on the context for which the content is used for. Hence, referred to as "the extent to which content is considered within the context of the task at hand to help in quality knowledge gained." The underlying sub-dimensions for contextual KQ are presented in Table III.

7.3 Representation KQ
Wang and Strong (1996) explained the aspects related to format of the data under representation DQ. The content presentation in eLearning environment is essential for representational quality measurement (Alkhattabi *et al.*, 2010). To gain the quality knowledge from the content in eLearning environment content representation is

essential. Hence, referred to as "the extent to which the content holds the quality representation to help in quality knowledge gain." Table III tabulates the identified sub-dimensions to meet the representational KQ.

7.4 Accessible KQ

The content which is easily available and quickly retrievable, achieve the accessible quality aspect. This study acknowledge the concept of Wang and Strong (1996) "consumers access computer for their information needs" for DQ measurement. Students use the content for their respective course needs, hence the quality of accessibility is required to be measured to understand the knowledge gain from the retrieved content. Here the accessible KQ is defined as "the extent to which the content is easily available and quickly retrievable to help in quality knowledge gain." The underlying sub-dimensions to measure accessible KQ are presented in Table III.

7.5 Actionable KQ

Knowledge is about action (Nonaka and Takeuchi, 1995). Researchers explain actionable KQ as "the extent to which knowledge is expandable, adaptable, or easily applied to tasks" (Yoo, 2012), "individuals come to an understanding based on the intrinsic value of knowledge in a particular situation, they take actions to apply the knowledge" (Valaei *et al.*, 2013). Putting the retrieved information into some action in real life to get the benefits is termed as actionable KQ. In the context of this study, the content, which is adaptable and applicable for different assignments and projects and can be expanded for future use, holds the quality knowledge feature. Here, it is defined as "the extent to which content is expandable, adaptable, or easily applied to tasks to help in quality knowledge gain." Table III presents the three identified sub-dimensions to measure actionable KQ.

8. Discussion

This study has shown that students who are interacting with the content in an eLearning environment are concerned about the content-related quality when making judgments about the quality of knowledge gained.

In total, 13 sub-dimensions that judge the quality of knowledge gain from online content in its own right or hold the intrinsic nature, have been identified in a qualitative analysis. In the educational perspective, students are concerned about accuracy and correctness of the content in the eLearning environment. Students acknowledged that content gives the correct answer to the required questions which fulfill the demand of quality knowledge. Erroneous content affects the student's knowledge repository and reduces the assignments and projects quality. Arranged content helps in easy understanding (Rao and Osei-Bryson, 2007) and diminishes the disturbed and frustrated feeling while searching for required content. The content contradiction in the repository leads to inconsistency. Inconsistency in uploaded content and their different file formats do not assist students in easy retrieval of content. The acquisition of a new idea and its use in any new process (Soo *et al.*, 2004) and product development is the essence of innovation (Popadiuk and Choo, 2006). Students look for new and current information about the topic which helps them in their projects and assignments. Alkhattabi *et al.* (2011) suggessted the equal distribution of content to achieve quality. Similarly students have shown concerns about content biasness in terms of its unequal distribution. Teachers' inclination toward one topic, instead of giving equal level of

attention to every topic, shows their biasness toward content. The extent, to which content is fulfilling its intended function with required accuracy, reflects its reliable nature. Information reliability has been discussed in various studies (McKinney *et al.*, 2002; Nelson *et al.*, 2005).

The findings also acknowledge the aspect of reliability and students confirmed the content reliability through cross refrences and discussion forums. Reliable content builds a positive reputation among users and highly regarded content is considered as reputed in terms of its source (Kahn *et al.*, 2002; Nelson *et al.*, 2005). Content with regular updating and innovative nature receive a significant reputation among students and up-to-date content helps in building a quality knowledge repository. Content usefulness can be judged through its further use by individuals or system (Chan *et al.*, 2008). The findings reveal that student's use eLearning content for various projects and assignments; this confirms its usefulness characteristic. To fulfill the definition of quality knowledge, three indispensable conditions of knowledge, i.e. "justified, true, believe" are required. In order to believe on the trustworthiness of internet or printed content, its authenticity is a key requirement. Content that has adequate justification in terms of its authentication fulfills the demand of quality knowledge (Waheed and Kaur, 2014; Nonaka, 1994). Students authenticate the trustworthiness of content through online databases such as JSTOR, ProQuest, etc. The availability of content from reputed journals helps the students to gain quality knowledge. Unavailability of content raise the problem of searching related online content from different sources. Everything that needed is mentioned in as few words as possible presents the concise content quality (Alkhattabi *et al.*, 2010). The teacher is responsible for providing compact and concise content from bulk of available information related to one topic, which gives them quality knowledge. Intrinsic KQ dimension hold these underlaying sub-dimensions.

Nine sub-dimensions feature the contextual aspect of content. Content sufficiency is considered important by researchers (Pipino *et al.*, 2002; Lee *et al.*, 2002) for quality measurement. Students have shown their satisfaction with the amount of available eLearning content. The completeness is explained as the extent up to which the content is covering the required concept (Chiu *et al.*, 2006) and the content with all the needed information (Alkhattabi *et al.*, 2011). Students' positive and negative concerns about content completeness contribute to this dimension. The time and date of content entry in the system shows it currency level (Cheng, 2012). The recently uploaded content must have new and latest information that gives quality knowledge. Students have acknowledged this aspect and confirmed the level of content currency for different resources. The sufficient depth and breadth (Rao and Osei-Bryson, 2007) presents the content's level of detail. Content with the ability to perform other tasks, e.g. projects and assignments, etc., encompass enough detail. Students reported their concerns over inadequate level of detail provided by the teachers on a particular topic. The content relevancy according to domain should be monitored (Rao and Osei-Bryson, 2007). The content must give the output, which is required by the student (Jeong, 2011). The untimely content loses its usefulness as compared to in-time information (Liaw *et al.*, 2013). The satisfactory response about in-time content availability is reported by many students. The content which is deeper in its meaning and context and improves user' understanding for practical use is considered as value added content. Findings revealed that the content is facilitating student's understanding which helps them in their projects and also adds to their knowledge. Convenience in finding the required content enhances student's satisfaction, which helps in gaining knowledge. Secure login system reduces the chances of uploading irrelevant, false, or untrustworthy

content in eLearning environment that improves its quality and subsequent quality knowledge gain from it. These sub-dimensions related to the contextual KQ dimension.

Six sub-dimensions emerged through qualitative analysis that explains the representation aspect of content. The importance of concise representation is emphasized by many researchers (Alkhattabi *et al.*, 2010; Cheng, 2012) and the findings of this study acknowledged the well presented, moderate, compact content in eLearning environment. While few students show their concern about improper content customization and presentation. According to researchers (Liaw *et al.*, 2013; Stvilia *et al.*, 2008) same structure and format in terms of uniformity in online content is important. Students consider it is as important aspect and reported dissatisfaction with the unarranged, unmanaged, and confusing layout of the content. Content presenting clear meaning is easily interpretable (Kahn *et al.*, 2002; Rao and Osei-Bryson, 2007). Students believe in the use of illustrations and interactive tutorials for clear and easy interpretation and improved understanding. The concise, consistent, and easily interpretable content increase the chances of understandability (Alkhattabi *et al.*, 2010; Kahn *et al.*, 2002). The importance of easy to understand content is expressed in this study findings. Less changes in interface design diminish the feeling of anger while finding the required information and the attractive interface builds the urge to explore more information becomes higher. Students shown their concerns about frequent changes and unattractiveness of eLearning environment. less changes in interface and use of eye chacking and attractive design is suggested by many students. Representational KQ encompass these underlaying sub-dimensions.

Three sub-dimensions explain the accessible nature of the content. Researchers discussed the importance of contents' accessibility (Alkhattabi *et al.*, 2011; Halawi *et al.*, 2007) and it was also reported by students in this study. Easy access to various resources with time and place autonomy improves the learning opportunity and subsequent knowledge gain. Students have reported the occurrence of technical issues like broken links, down network while accessing content. It leads to other untrustworthy resources and reduce the chance of getting more informative and quality content that significantly effect on student's quality knowledge gain. Similarly, poor internet speed shift to low-quality content usage that may not give complete knowledge about the topic. Students mentioned the importance of network strength to access big size documents. These sub-dimensions present the actionable KQ dimension.

Three sub-dimensions present the actionable nature of the content. The content adaptability for relevant tasks is acknowledged by researchers (Yoo *et al.*, 2011) and students mentioned the adaption of available content in various projects and assignments. The content may be relevant but not applicable for many assigned tasks. Students confirmed that the content can be used and applicable for my class discussions, forums participation, upcoming class's notes preparation, and communication with teacher and students. The previous concepts and their practical use helps in expanding the knowledge (Yeh *et al.*, 2011). Students expressed the content expendability in terms of gaining inspiration, innovative ideas, and knowledge about the topic. Use of content for reviewing the literature is also reported by students. These aspects present the actionable KQ dimension.

9. Conclusion

This study is an exploration of the KQ dimensions associated with the eLearning content as perceived by students in a single government university in Kuala Lumpur. It extends existing research on the KQ by: first, contributing the qualitative analysis

method to understand the KQ phenomena and its underlying dimensions from students' perspective; second, employing the eLearning context to the study. The qualitative analysis highlights the 34 sub-dimensions associated with eLearning KQ. These sub-dimensions unearth the content-related quality requirements in eLearning environment that contribute to student's knowledge gain. Five major dimensions based on the shared commonalities of each sub-dimension are termed as eLearning KQ dimensions. The findings are consistent with the KQ conceptualization (Waheed and Kaur, 2014) and confirms these five dimensions as the key determinants of eLearning KQ, dimensions are termed as: intrinsic KQ (accurate, consistent, innovative, unbiased, reliable, reputed, updated, useful, believable, trustworthy, justified, available, conciseness), contextual KQ (appropriate, complete, current, level of detail, relevant, timeliness, value added, convenient to find, secure), representation KQ (concise representation, consistent representation, interpretable, understandable, stable representation, attractive), accessible KQ (accessibility, technical accessibility, network strength), and actionable KQ (adaptable, applicable, expandable).

The study findings address the research gap in KQ measurement and present the KQ as the major theoretical implication for the theory of knowledge. In this study, elusive use of IQ dimensions to measure KQ in previous studies is criticized at first that is addressed by presenting the KQ dimensions that are uniquely associated with KQ construct. Next, the study investigates the student's perspective about what constitutes quality knowledge, while previous studies only investigated the employee perception. KQ dimensions in the context of eLearning environment are identified, unlike previous study (Alkhattabi *et al.*, 2010) that discusses only the IQ in eLearning environment. At last, we used the qualitative approach to understand the students' perspective about KQ dimensions that address the methodological research gap of neglecting the use of grounded data to validate the KQ measurement considering it as new phenomena (Creswell and Clark, 2010).

The KQ dimensions are the key theoretical contribution of this study. Readers interested in exploring the theory of knowledge might be concerned for the essential attributes to measure KQ. The KQ dimensions proposed in this study extends the theory of knowledge and presents the knowledge as quantifiable construct in terms of its quality.

The practical implications of these findings are for the educators/teachers/coordinators to consider intrinsic, contextual, representational, accessible, and actionable aspects of the content before making it available for student's use. We suggest that developers should design content that include the necessary aspects to provide quality knowledge. In educational context the success of eLearning environment and measurement of quality knowledge depends on whether students perceive it to be of good quality. If students think a content is not intrinsically good, not within the context of the task at hand, not represented properly, not accessible, and cannot be adaptable – it will influence their quality of knowledge gained from it. For this purpose, it is suggested that educators actively take part in updating the resources in timely manner with more accuracy and objectively. It is also suggested that they encourage the students to utilize the available features like discussion forums to gain more knowledge about the topic.

The identified dimensions pave the way to future studies and a number of interesting avenues and research directions can be suggested. The proposed KQ dimensions can be used to measure the KQ in KMSs. Additionally the dimensions can be utilized to judge the employee KQ that may influence firm performance and competitiveness. Since, a single study is not sufficient for validation; further research is needed to apply the proposed dimensions. In future research quantitative analysis of KQ dimensions and its subsequent influence may give a better understanding of KQ measurement.

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