Development of a New Model for an e-RPL System Quality Evaluation: A Case Study of Kenya Technical Trainers College

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Abstract

The education sector just like any other formal sectors has been largely affected by the emergence of new forms of technology, which present both opportunities and challenges. Quintessentially, many educational institutions have embraced the use of technology from a one-dimensional aspect of the prospects of technology in the formal learning while disregarding the challenges presented in integrating the use of technology in teaching and learning in non-formal and informal settings. Specifically, educational institutions have disregarded the role of embracing quality in the design and implementation of eLearning systems in the non-formal and informal education systems. Adopting a quantitative approach, this research aims at evaluating the development of a new model of enhancing quality in the design of electronic Recognition of Prior Learning (eRPL) system in the informal education setting by modifying the eLearning Quality Framework (EQF). Questionnaires were used to collect data from a total of 140 students enrolled at Kenya Technical Trainers College (KTTC) in order to establish the determinants of quality in eLearning systems for eRPL. Descriptive statistics and weighting factor analysis were undertaken on the data collected. Results from the analysis indicate that quality in eLearning is mainly determined by the following; content design, eLearning system quality, learner experiences and social support, technology factors, assessment and evaluation and institutional factors. In terms of importance, it is recommended that the designers should put more emphasis on providing the following quality parameters in the eLearning system; up-to-date content, supported by multiple mobile devices, offers easy navigation of learning experiences, offers and is available on a 24/7 hours basis, has the ability to accurately store assessment data and ensures that the service provider has enough resources to implement eLearning. It is recommended that future research should focus on exploring how interactive and intelligent emerging technologies such as Internet of Things, Virtual Reality and Artificial Intelligence can be infused in the design of quality and responsive eRPL systems.

Key words: *Innovative teaching, transitory learners, teaching models*

Introduction

eLearning systems are electronic media that support a variety of learning purposes such as online encounters and add-on functions in conventional classrooms (Sangrà, Vlachopoulos & Cabrera, 2012). Koohang & Harman (2005) define eLearning as the use of various electronic media in the delivery of educational activities such as learning, teaching and assessments. Thus, based on the definitions of eLearning given by Sangrà, Vlachopoulos & Cabrera, (2012) and Koohang & Harman (2005), eRPL can be defined as the delivery of informal learning experiences through the use of electronic media (Callan, Johnston & Poulsen, 2015). The emblematic sprout of e-learning systems as a result of dynamism in new technology forms presents both opportunities and challenges (Sarker, Mahmud, Islam & Islam, 2019). While majority of education stakeholders continue to embrace the use of eLearning systems based on the opportunities presented within formal learning domain, little emphasis has been placed on the inherent challenges of adopting eLearning systems especially within the informal learning domain as opined by Dobreski and Huang (2018). They observed that this ultimately culminates in the adoption of eLearning systems that offer optimal value constructs within the formal learning domains while neglecting value dispositions in the informal learning domain. Nowadays, the integration of technology in education as espoused under eLearning systems is crucial and critical not only for enhancing learning organizations and institutions but also for promoting resilience among educational institutions in times of global pandemics such as Covid 19 (Amelia, Kadarisma, Fitriani, & Ahmadi., 2020). However, within the realms of RPL, the novelty of the concept especially in developing and under-developed countries makes the adoption of eRPL a mirage (Mourali et al., 2020). Mourali et al., (2020) suggest that although there is a growing body of empirical findings on the concept of quality in eLearning systems, academicians still have not examined the concept of eRPL and how quality can be effectively implemented in the design of eRPL systems. Moreover, even though countries such as Germany have effectively implemented the use of eRPL and digital credentialing (Conrad, 2022), little has been undertaken in ascertaining how quality can be implemented in eRPL systems in the Kenyan context. Thus drawing on the constructivism theory of learning and the SERVPERF model of service quality this paper aims at developing a new framework for evaluating quality dimensions in eRPL systems by modifying the eLearning Quality Framework (EQF) by Masoumi and Lindstrom (2012).

Literature Review

Theoretical Lens

This research aims at modifying the EQF framework as proposed by Masoumi and Lindstrom (2012). They proposed seven constructs that can be used to evaluate the quality of eLearning systems. As noted by Masoumi and Lindstrom (2012), the seven constructs are; pedagogical factors, institutional factors, evaluation factors, technological factors, instructional design, student support and faculty support. As they stipulated, the technological dimension deals with the accessibility of learning management platform and the associated infrastructure, the instructional design deals with learning materials, experiences and outcomes, the institutional factors deals with the available institutional support while the faculty support deals with course creation and technology dimension. Masoumi and Lindstrom (2012) continued to argue that, the student support deals with the availability of technical and administrative support to learners, pedagogical factor deals with the learning content, available resources and communication while the evaluation factor deals with learning effectiveness, trainee and trainer satisfaction.
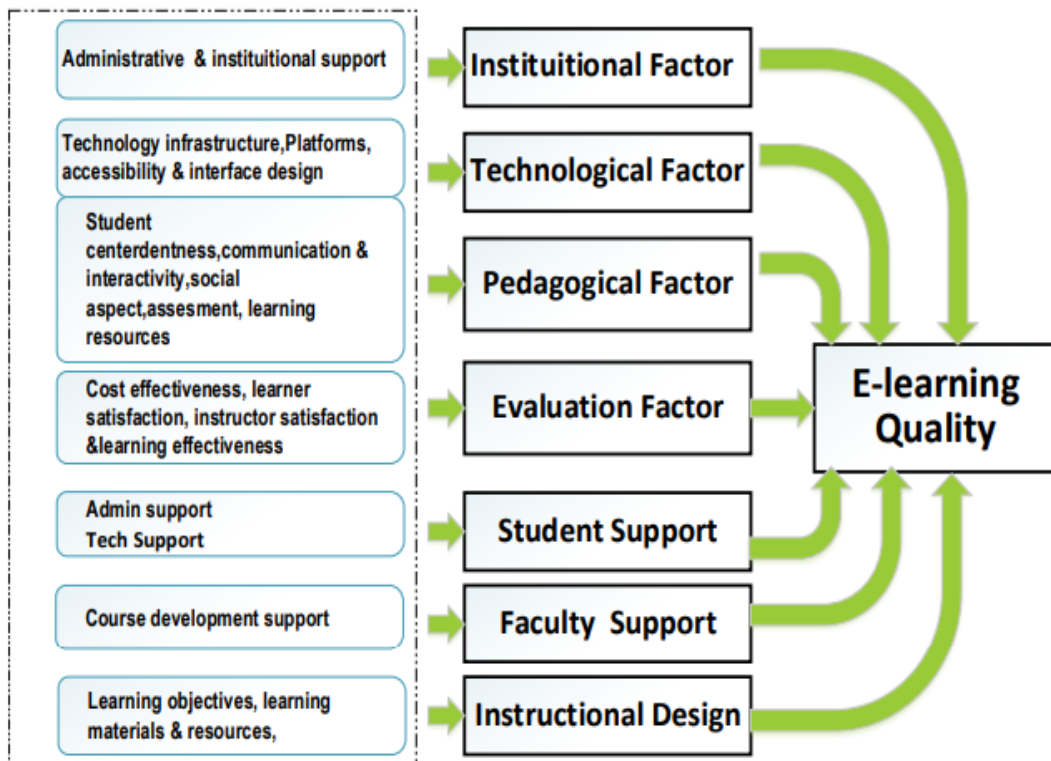
Figure 1: The EQF framework by Masoumi and Lindstrom (2012)

Numerous studies have explored the constructs and determinant factors of service quality in eLearning systems. For instance, Kanuka (2006) notes that one construct of quality in eLearning systems is the design of the content which is not only constricted to the subject content but also includes the delivery medium. According to Wright (2003), course design encompasses diverse constructs such as; learning outcomes, the organization of the course and relevant course information. For Chawinga and Zozie (2016) and Mtebe and Raisamo (2014), well designed online content promotes quality in eLearning. Another enabler of eLearning quality is the aspect of available support for the online contexts. While synchronous systems may offer students with immediate content support from the trainer, Eke (2010) points out that in asynchronous eLearning systems content support proves to be a major challenge due to lack of instant feedback. Nevertheless, Wu et al. (2012) observes that in asynchronous systems, the use of multimedia extensions and add-ons allows trainers to collaborate independently and assist one another. In an empirical analysis by Weng et al. (2015), the authors noted that social support which is defined within the confines of family, peer and organizational support was a key enabler of quality in eLearning. As such, social support enhances collaborative activities among peer learners through discussion forums while at the same time increasing the interaction between learners and course facilitators. Mtebe and Raisamo (2014) observed that eLearning system quality can be defined in terms of the level of user satisfaction, the availability of quality information, and the service quality offered by the eLearning systems. In another study, Hartsell and Yuen (2006) notes that increased level of learner interactivity and the ability to provide positive learning experiences such as high success rates in eLearning evaluations is a major determinant of quality in eLearning systems. Thus, for Hartsell and Yuen (2006) positive learning experiences is a major determinant of quality in eLearning systems. Another determinant of quality in eLearning is the ability of instructors and online facilitators to effectively use the technology in creating meaningful learning experiences (Nawaz & Khan, 2012). Furthermore, as noted by Yusuf,

Widyaningsih, Prasetyo and Istiyono, (2021), quality in eLearning systems can be promoted through providing online tests with immediate and timely feedback. They argue that, there is need for online tests to be administered in an authentic manner that promote the integrity and purpose of assessments. Lastly, another determinant of quality in eLearning systems deals with institutional capacity in terms of available infrastructure, support and effective eLearning policies (Al-Azawei, Parslow & Lundqvist, 2016).

In summary, it can be noted that the main determinants and constructs of service quality in eLearning systems are; content design, eLearning system quality (user satisfaction, available of quality information and service quality), learner experiences (ability to promote interaction and offer meaningful learner experiences), ease of use of technology (by the instructors and learners as well), the availability of effective assessments and institutional factors.

Methodology

Guided by the constructivist theory of learning in which RPL focuses on experiential informal and non-formal learning (Lam, Ng, Tse, Lu, & Wong, 2021), the SERVPERF model of service quality was adopted to further develop a quality validation tool based on the 22 dimensions of the SERVPERF quality experiences.

Table 1:

The SERVPERF Model of Service Quality

Tangible **(4 items)**	Q1: service firm has up-to-date equipment
	Q2: The physical facilities are visually appealing
	Q3: The employees are well dressed and appear neat
	Q4: The appearance of the physical facilities is in keeping with the type of service provided
Reliability **(5 items)**	Q5: When the employees promise to do something by a certain time, they does so
	Q6: The employees are sympathetic and reassuring when the customers have problems
	Q7: The employees are dependable
	Q8: The employees provide their service the time they promise to do so
	Q9: The employees keep their record accurately

Responsiveness **(4 items)**	Q10: The employees are expected to tell customers exactly when the service will be performed
	Q11: It is realistic for the customers to expect prompt services from the employees
	Q12: The employees are expected to always help the customers
	Q13: It is a problem if the employees are too busy to respond to the customers' request promptly
Assurance **(4 items)**	Q14: The customers trust the employees
	Q15: the customers are able to feel safe in their transactions with the employees
	Q16: The employees are polite
	Q17: The employees should get adequate support from the service firm's management to do their jobs well
Empathy **(5 items)**	Q18: the employees are expected to give customers individual attention
	Q19: The employees are expected to give customers personal attention
	Q20: It is expected that the employees know what the needs of their customers are
	Q21: It is expected that the employees have their customers best interest at heart
	Q22: The employees are expected to have operating hours convenient to all their customers.

In developing the eLearning quality validation tool, service quality items were developed by linking the determinants of quality in eLearning as evidenced in literature with appropriate SERVPERF quality statements – See Figure 3. After the development of the validation tool, the tool was mapped to the EQF framework in order to determine missing quality components in the EQF framework which were later used in developing questionnaire items for the case study (Kenya Technical Trainers College students). Quality items that were found to be both in the validation tool and the EQF framework were removed through "striking them through" as seen in Figure 4. The remaining quality items were later used in developing questionnaire items for the target population. Table 1 below indicates a summary of the missing items in the EQF which were used in the development of data collection tool

Table 2:

Validation tool for Quality in eLearning after Mapping Literature Review to SERVPERF Model

Quality constructs (From literature review)	Corresponding EQF quality dimension	New eLearning quality dimensions
Content design	Instructional design	-The content offered is up to date (Q1) -The content design has good visual appealing (Q2)
eLearning system quality	Evaluation factor	-The system provides quality information through safe handling of information (Q3) -The eLearning system is dependable (Q4) -The eLearning provides prompt services (Q5) -The eLearning can be supported by multiple mobile devices (Q6)
Learner experiences and Social Support	Student Support, Pedagogical factors	-The eLearning promotes trust among users -The eLearning offers safe storage of data (privacy, confidentiality and Integrity) (Q7) -The system offers easy learning experiences (Q8) -The eLearning system is available on a 24/7 hours basis (Q9)
Ease of Technology use	Technology factor	-The system is easy and simple to use (Q10) -The system has simple self-service support (Q11)
Effective assessments and evaluations	Pedagogical Factors	-The eLearning promotes trust in undertaking online assessments (Q12) -The eLearning offers safe storage of assessment data (privacy, confidentiality and Integrity) (Q13) -The eLearning system has the ability to accurately store assessment data (Q14)
Institutional factors	Institutional Factor	-The service provider has enough resources to implement eLearning (Q15) -The service provider has enough human and capital resources to train employees on eLearning systems (Q16)

Table 3:

Mapping the eLearning quality Dimensions to the EQF framework by Masoumi and Lindstrom (2012)

Quality constructs (From literature review)	Corresponding EQF quality dimension	New eLearning quality dimensions
Content design	Instructional design	-The content offered is up to date -The content design has good visual appealing
eLearning system quality	Evaluation factor	-The system provides quality information through safe handling of information -The eLearning system is dependable -The eLearning provides prompt services -The eLearning can be supported by multiple mobile devices
Learner experiences and Social Support	Student Support, Pedagogical factors	-The eLearning promotes trust among users -The eLearning offers safe storage of data (privacy, confidentiality and Integrity) -The system offers easy learning experiences navigation -The eLearning system is available on a 24/7 hours basis
Ease of Technology use	Technology factor	-The system is easy and simple to use -The system has simple self-service support
Effective assessments and evaluations	Pedagogical Factors	-The eLearning promotes trust in undertaking online assessments -The eLearning offers safe storage of assessment data (privacy, confidentiality and Integrity) -The eLearning system has the ability to accurately store assessment data
Institutional factors	Institutional Factor	-The service provider has enough resources to implement eLearning -The service provider has enough human and capital resources to train employees on eLearning systems

Table 4

eLearning Quality Items Missing in the EQF Framework

Quality constructs (From literature review)	Corresponding EQF quality dimension	New eLearning quality dimensions
Content design	Instructional design	-The content offered is up to date (Q1) -The content design has good visual appealing (Q2)
eLearning system quality	Evaluation factor	-The system provides quality information through safe handling of information (Q3) -The eLearning system is dependable (Q4) -The eLearning provides prompt services (Q5) -The eLearning can be supported by multiple mobile devices (Q6)
Learner experiences and Social Support	Student Support, Pedagogical factors	-The eLearning promotes trust among users (Q7) -The eLearning offers safe storage of data (privacy, confidentiality and Integrity) (Q7) -The system offers easy learning experiences navigation (Q8) -The eLearning system is available on a 24/7 hours basis (Q9)
Ease of Technology use	Technology factor	-The system is easy and simple to use (Q10) -The system has simple self-service support (Q11)
Effective assessments and evaluations	Pedagogical Factors	-The eLearning promotes trust in undertaking online assessments (Q12) -The eLearning offers safe storage of assessment data (privacy, confidentiality and Integrity) (Q13) -The eLearning system has the ability to accurately store assessment data (Q14)
Institutional factors	Institutional Factor	-The service provider has enough resources to implement eLearning (Q15) -The service provider has enough human and capital resources to train employees on eLearning systems (Q16)

Participants and case study

A case study was conducted in Kenya Technical Trainers College (KTTC) which is located in Nairobi County and the only premier institution that offers technical teacher training courses. KTTC has been flagged as one of the pioneer institutions that will serve as a Qualification Awarding Institution (QAI) for RPL which makes it an ideal case study to investigate quality dimensions in eRPL. A total of 140 students enrolled at KTTC were randomly selected from 5 different departments in order to guarantee diversity in the participants' responses. The potential participants were initially approached and asked if they could participate in the study. The participants were required to provide their responses on questionnaire items that were measured on a 5-point Likert scale (0 – Strongly Disagree, 1 – Disagree, 3 – Neutral, 4- Agree and 5 – Strongly Agree).

Internal Validity

Internal validity was measured using the Cronbach alpha in which the value of the Cronbach Alpha was o.72 which implies that the questionnaire that was used in the data collection was reliable as the Cronbach Alpha > o.600 (Sürücü & MASLAKÇI, 2020).

Data analysis

Given the ordinal and univariate nature of the data collected and variables, the researcher adopted the use of mode as a measure of central tendency to determine the most selected Likert scale type response among the five categories rather than the use of non-parametric tests that test for independence. The mode value was later categorized within the corresponding Likert scale type numerical value which was later used in the calculation of weighted factors in order to determine the normalized importance of the factors. The weighted factors were calculated using the following formula

$$Wf = (Mnorm - Min) / Max - Min$$

Where

Wf = Weighted factor

Mnorm = Likert value deduced from the mode

Min = The minimum Likert scale value for the questionnaire item

Max = The maximum Likert scale value for the questionnaire item

From the above calculations, the researcher developed a table that contains the values of the mode alongside the weighted factors as illustrated in Table 5.

Table 5
Median and associated weights

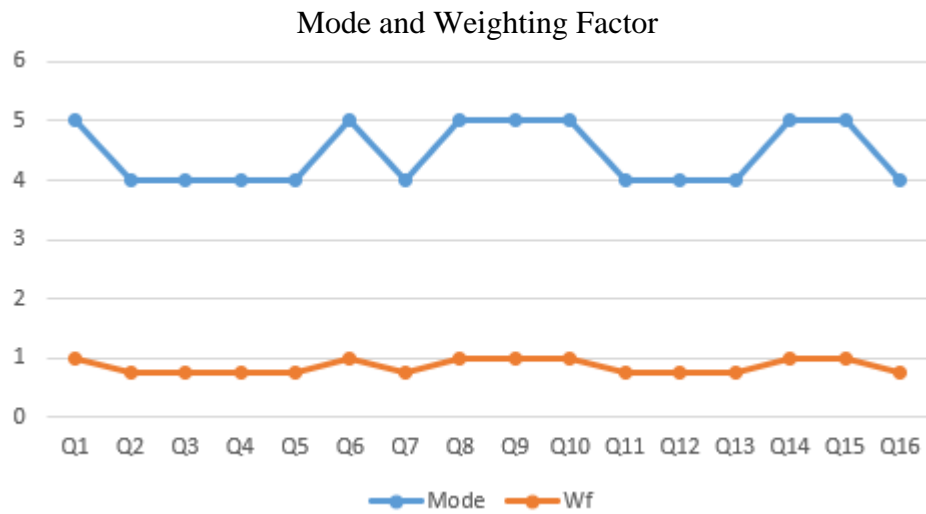| Quality	Mode	M_{norm}	Max	Min	W_f
Q1	5	5	5	1	1
Q2	4	4	5	1	0.75
Q3	4	4	5	1	075
Q4	4	4	5	1	0.75
Q5	4	4	5	1	0.75
Q6	5	5	5	1	1
Q7	4	4	5	1	0.75
Q8	5	5	5	1	1
Q9	5	5	5	1	1
Q10	5	5	5	1	1
Q11	4	4	5	1	0.75
Q12	4	4	5	1	0.75
Q13	4	4	5	1	0.75
Q14	5	5	5	1	1
Q15	5	5	5	1	1
Q16	4	4	5	1	0.75

Figure 1: Line Graph Showing the Median and Associated Weight

Findings

From the data analysis undertaken, most of the participants strongly agreed that parameters Q1, Q6, Q8, Q9, Q10, Q14 and Q15 were the core determinants of service quality in eLearning systems. Moreover, with regard to importance as contextualized under the weighting factor analysis, all the parameters that have the highest responses of strongly agree were considered as being important in the design of eLearning systems. Moreover, the results also indicate that, participants agreed that parameters Q2, Q3,Q4,Q5,Q7,Q11,Q12,Q13 and Q16 were also key determinants of quality in eLearning systems with all recording a weighting factor of 0.75. Thus, it can be concluded that, all the above listed quality factors (Q1 to Q16) should be considered in the development of eLearning systems for eRPL with an emphasis on the following parameters; providing up to date content (Q1), providing eLearning systems that can be supported by multiple mobile devices (Q6), providing an eLearning system that offers easy navigation of learning experiences (Q8), providing an eLearning system that offers and is available on a 24/7 hours basis (Q9), providing an eLearning system has the ability to accurately store assessment data (Q14) and ensuring that the service provider has enough resources to implement eLearning (Q15). The above sentiments are in line with the arguments made in literature such as the arguments by Hussain (2020) who recommends the provision of up-to-date content and Alhumaid et al. (2020) who opine that eLearning systems should be supported on multiple mobile devices. Moreover, Hasani et al. (2019) notes that eLearning should offer easy navigation user friendly interfaces. On the other hand, Amiti (2020) argues that effective eLearning should be readily available and offer both synchronous and asynchronous support while Ibrahim et al. (2020) contends that quality in eLearning systems should promote data integrity, privacy, availability and confidentiality. Finally, Nene (2021) notes that the ability to offer quality eLearning systems depends on the resource capacity of an organization in terms of both technical, moral and financial support in the implementation of eLearning.
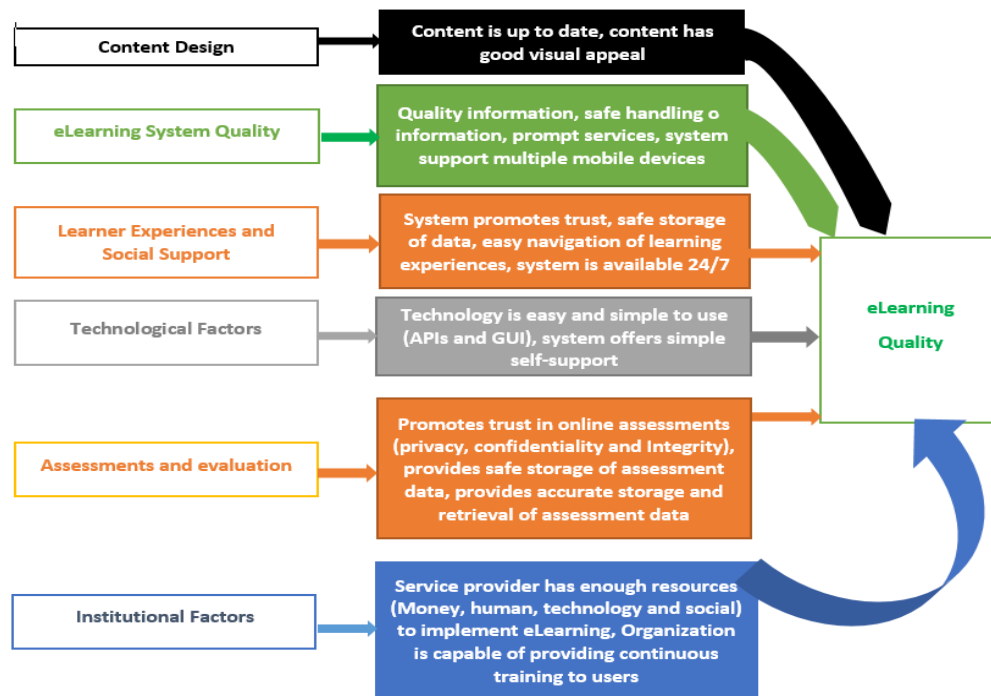

Figure 2: Proposed eLearning quality evaluation Framework

Conclusion and future research

The research adopted a quantitative approach in which data was collected from a total of 140 students enrolled at KTTC in order to evaluate the determinants of quality in eLearning systems for eRPL with the intention of modifying the EQF framework. Descriptive statistics and weighting factor analysis was undertaken on the data collected with results indicating that quality in eLearning is mainly determined by the following factors; content design, eLearning system quality, learner experiences and social support, technology factors, assessment and evaluation and institutional factors. In terms of importance; it is recommended that, eLearning system designers should put more emphasis on the following quality parameters; providing up to date content (Q1), providing eLearning systems that can be supported by multiple mobile devices (Q6), providing an eLearning system that offers easy navigation of learning experiences (Q8), providing an eLearning system that offers and is available on a 24/7 hours basis (Q9), providing an eLearning system has the ability to accurately store assessment data (Q14) and ensuring that the service provider has enough resources to implement eLearning (Q15). However, the present research is limited in terms of methodology in two main aspects. Firstly, RPL has not been fully implemented at KTTC, thus the responses provided may not offer the actual eRPL experiences of the sample population. Secondly, the final sample of 140 KTTC students may not be effectively used for generalization, thus it is recommended that future research should widen the scope of the sample population while at the same time collect data from actual users of eRPL systems. Moreover, the present study did not consider the impacts of technology dynamics on service quality evaluation in eRPL systems thus there is a need to further explore how new forms of technology such as Internet of Things (IoT), Artificial Intelligence (AI) and Virtual Reality (VR) affects quality in eRPL

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