The Online Journal of Distance Education and e-Learning

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Message from the Editor-in-Chief

Hello from TOJDEL

TOJDEL welcomes you. This journal was initiated in January, 2013 to share knowledge with researchers, innovators, practitioners and administrators of education. We are delighted that more than 190000 researchers, practitioners, administrators, educators, teachers, parents, and students from around the world had visited TOJDEL since January, 2013.   It means that TOJDEL has diffused successfully new developments on distance education and e-learning around the world.   We hope that the volume seven issue four will also successfully accomplish our global distance educational goal.

I am always honored to be editor in chief of the TOJDEL. Many persons gave their valuable contributions for this issue. I would like to thank to all reviewers.

For any suggestions and comments on the international online journal TOJDEL, please do not hesitate to contact with us.

October 01, 2019
Editors,
Prof. Dr. Aytekin İŞMAN
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AN ACTION RESEARCH OF O2O BLENDED LEARNING IN THE INTEGRATED ENGLISH CLASS UNDER THE CONTEXT OF A CHINESE PRIVATE LANGUAGE UNIVERSITY

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ABSTRACT
Based on the framework of action learning, this study attempted to construct an online-to-offline (O2O) blended class of integrated English based on the flipped classroom, focusing on cultivating students' listening and speaking capability and critical thinking ability, improving students' competence to analyze and solve problems using English, and giving full play to students' personality characteristics. This action research spanned from February 2019 to June 2019. Taking the 130 students of integrated English class of College of International Business (CIB) of Zhejiang Yuexiu Foreign Languages University (ZYUFL) as samples, this paper adopted qualitative research methods, through the analysis of log observation and reflection reports, combining with comparisons of the quantitative online data. This paper drew the conclusion that the O2O blended learning based on flipped classroom in the integrated English class was the practice of innovative teaching mode and it created interactive classes of integrated English. It is suggested that if implemented from the beginning of freshman year, the continuation effect of this teaching mode should be better. In addition, if more teacher training opportunities were available, and if the teaching facilities and environment could be improved, the effect of this teaching mode should be more significant.
Keywords: action learning, O2O blended learning, flipped classroom, interactive classes

INTRODUCTION
College foreign language strategy is an important part of Chinese national strategy in 2018. It is the duty of foreign language teachers in colleges and universities to actively cultivate students' ability to directly absorb international frontier information and exchange scientific research developments in their respective fields in foreign languages, and their ability to carry out work and research in foreign languages after graduation. Under the context of globalization 2.0 (Vielmetter, G., & Sell, Y., 2014), university English teachers in China should aim to cultivate the international compound talents urgently in alignment with the globalization trend; and it must cultivate the comprehensive ability and critical thinking ability of students to raise and solve problems; at the same time, it should adapt to the development of new technologies, reform teaching methods and make full use of various online resources.

Zhejiang Yuexiu University of Foreign Languages (ZYUFL) is a private language university in Zhejiang Province, North east of China (near Hangzhou and Shanghai). With more than 16,000 students and over 1,000 teachers and administrators in total. As the university with the largest number of foreign languages, ZYUFL stays in the forefront of various kinds of educational reforms and researches. The greatness of a university lies in the greatness of its teachers, and the excellence of a university lies in the excellence of its students. Classroom is the main way for students to acquire knowledge. Therefore, in order to maximize the growth and development of students, teachers must reform teaching methods and renew teaching concepts. Since 2018, ZYUFL calls on teachers carrying on online-to-offline blended learning reform to classroom teaching. The researcher applied for an online-to-offline blended learning project based on flipped classroom in 2019. The study was part of the research results (ZYUFL Online Database, 2019).

LITERATURE REVIEW
Action Learning: This study is based on the theory of action learning. Action learning is a comprehensive learning model, which integrates theoretical learning and behavioral cognition, and then carries out group learning and interactive sharing (Revans, 1982). It is mostly used in the field of medical and business training, and its practice in the field of education has gradually expanded in the past 20 years. In schools, especially in MBA teaching in business schools, action learning is an important method of teaching reform. Action learning method was first used by Reg Revans in 1940s to train and develop employees in the coal industry in Britain. Since the 1980s, action learning has been gradually applied in medicine, commerce and education. Nowadays, many universities in the United Kingdom and the United States offer courses based on action learning. There is a simple equation to explain the action learning method: AL (Action Learning) = P (Programmed Knowledge) + Q

(Questions) + R (Reflection) + I (Implementation), that is, action learning = structured knowledge + query + reflection + execution (Marquardt, 2004). In the MBA course of higher education, action learning method has achieved good practical results. Dutch Business School is one of the first business schools in the world to introduce "action learning" into management education. It enjoys a high reputation in both business and academic circles in Europe. Compared with the traditional teaching methods, the action learning method attaches more importance to the combination of learning and practice, and leads students to improve their problem-solving literacy and ability, with the growth and development of learners as the core, so as to stimulate students' internal learning motivation. The training goal of Applied Talents in ZYUFL coincides with the practice of action learning (ZYUFL Online Database, 2019). In English learning, action learning enables students to develop their practical application abilities such as cross-cultural communication.

Blended Learning: Blending learning is also called hybrid learning or flipped classroom in the literature. According to Graham (2006): "Blended learning systems combine face-to-face instruction with computer-mediated instruction" (p.5). The traditional education where face-to-face teaching mode was in dominant position now is being changed by the wide application of digital technology. The educational field is also adapting to the trend of integrating technology into education, so that students can survive in the world where technology is widely used (Lu, et al, 2018; Meyer et. Al., 2014). Combining online learning with face-to-face teaching can enhance students' interaction and learning enthusiasm, form a more open and communicative learning environment, and produce meaningful learning outcomes (Garrison & Kanuka, 2004). Several benefits can be listed out of O2O blended learning. On one hand, pre-class preparation can promote students' learner autonomy and help them develop self-directed learning habits; on the other hand, learning experiences in collaboration with peers can be motivating. Students form a learning community online and they can be much courageous to express their views, especially in high-context culture like China. There are researches showing students' positive attitudes towards O2O blended learning (López-Pérez et al.,2004; Paechter et al., 2010; Wang et al., 2009) and students' expansion in learning to the out-class environment (Kasraie & Alahmed, 2014; Shih, 2011; Zhu, 2012). Face-to-face teaching activities and network seminars offer students asynchronous content so that they can learn according to their own time and rhythm. It takes students' individual differences into full consideration. Subsequent classroom discussions help students better understand the topic and develop their cognitive and social skills. Sharp et al. (2006) conducted a research reviewing more than 300 blended learning studies, they summarized three main ways of blended learning. First, the most common way of blended learning is that mainly provides additional learning resources for institutions-supported courses on a virtual learning platform. Second, there is a few radical and transformative blended learning mode. It aims to promote interaction and communication through technological innovation, thus replacing other teaching modes. The third mode of change is no longer led by educators or educational institutions, but by students. Students nowadays use a wide range of technologies, such as mobile phones, laptops, e-mail, networking apps and online database. This current study, to a large extent, combines the first mode and the third mode, supplementing online learning materials and making full use of students' self-learning ability. Thanks to the flexibility and diversity of O2O blending learning, it's of great use to teachers and researchers to design appropriate programs in their own specific contexts. The study adopts the framework of action learning and designs the semester into three action learning cycles based on three main themes, which is going to be elaborated in details in the following sections.

PURPOSE OF THE STUDY
The primary objectives of the study are:
- To assess and analyze students' perception of O2O blended learning model in the integrated English class.
- To make comparative study of students' perception of O2O blended learning model in the integrated English class between the two classes (A5 & A6).
- To make comparative study of students' perception of O2O blended learning model in the integrated English class between the two classes (A5 & C7).
- To make comparative study of students' perception of O2O blended learning model in the integrated English class between the two classes (A6 & C7).

METHODS AND PROCEDURES
The focus of the research is to assess and analyze students' perception of O2O blended learning model in the integrated English class in the College of International Business (CIB), Zhejiang Yuexiu University of Foreign Languages (ZYUFL). This current research adopted a mixed-method approach combining qualitative with quantitative methods (Creswell, 1994). The observation logs of the researcher and reflection papers of students were used to assess and analyze students' perception of O2O blended learning model in the integrated English class. The quantitative data were collected from the online education integrated platform of ZYUFL (http://umooc.yxc.cn/meol/index.do). The online learning resources were based on the Chinese MOOC Online (https://www.icourse163.org/) and the excellent resources of teachers in ZYUFL.

The survey population of this research consists of students from CIB of ZYUFL. Convenience sampling method was used to draw 130 samples from three classes (A5=45, A6=51, C7=34) of CIB. The researcher made clear explanation about the purpose of the research to the participants before collecting data.

Since September 2018, stratified English teaching was applied in the sophomores of non-English major in ZYUFL. Table 1 shows the criteria of stratified English classes. CET 4 & 6, the abbreviation of College English Test Band 4 & 6, are conducted by the Department of Higher Education of the Ministry of Education. The junior college students, undergraduates and postgraduates have to complete CET-4 according to the syllabus (Zheng & Cheng, 2008).

Table 1: Standards of Stratified English Teaching in ZYUFL

Stratified English Classes	Criteria
A	Those who pass CET 6
B	Those who pass CET 4
C	Those who did not pass CET 4

The textbooks they used were the fourth volume of the New Target College English Textbook Series. There were compulsory seven units in this semester, namely, Unit 1, 3, 4, 5, 6, 7 and 8, which could be re-integrated into three categories, namely, "Self-awareness", "Green Technology" and "Emerging Science and Technology". At the beginning of the semester, three classes were grouped into several (A5=six groups, A6=seven groups, C7=six groups). Each group has its own unique group name and slogan, representing the core ideas and learning objectives of the group. It facilitates team building process and enables students to learn together.

Based on the researcher's previous study of action learning in the integrated English class and the concept of flipped classroom, the O2O blended learning model in the integrated English class mainly consists of three parts: "Preview Classroom" in pre-class phase -- students have to preview online before class. "Dialogue Classroom" in in-class phase -- teachers and students interact face-to-face, and answer questions, share, evaluate and expand what have been learned in class. "Reflective Classroom" in after-class phase -- both teachers and students have to reflect about the learning process after class. In the whole action learning circle, teachers constantly optimize teaching design and innovate teaching methods. Students try to improve their ability to understand, raise and solve problems. The two-way interactive evaluation method of peer evaluation and teacher evaluation, and the cross-teaching method of peer guidance and teachers' supervision can not only enable students to input and consolidate basic knowledge, but also give students space to innovate and play, so that they can learn to use. Such wisdom "classroom" combines the characteristics of knowledge indoctrination in low-level classroom and the integration of knowledge and practice in high-level classroom.

Preview Classroom: Before class, the teacher assigned the list of self-study tasks to the students before class, then tracked the students' learning situation and gave timely feedback. At the same time, the teacher sorted out the participation of students in platform learning and the common questions raised by students. Referring to the students' self-test feedback sheet, the teacher determined the main points of the objectives in class, and summarized the teaching objectives, knowledge points and problems, mainly focusing on the objectives, key points and problems for teaching design. Students studied online independently in the online education platform of ZYUFL, through watching videos and learning ppt slides and word files. Then students tested themselves on the online platform and summarized the knowledge points. After sorting out the relevant difficulties and unsolvable problems, students could discuss them with teachers and students online. Those difficulties that could not be solved would be left for discussion offline face-to-face.

Dialogue Classroom: During the course, the main activities of teachers and students include the following aspects: (1) Vocabulary contest (individual), which follows the design concept from easy to difficult, focusing on the detection of students' basic knowledge and re-examination of pre-class learning. (2) Intensive knowledge points (individual), intensive principles: complex knowledge would be summarized by the teacher and the general knowledge would be summarized by students. In each class, students may be picked out to summarize, thus promoting students' understanding of knowledge systematization and motivating them to make good preparations. (3) Group discussion, the topic of group discussion should be closely related to the unit theme and students' real life, encourage students to put forward learning topics, and teachers should give some guidance to deepen students' understanding and application of knowledge to solve practical problems. (4) Outward bound exercises (group/individual) are an important part of improving students' cross-cultural communication awareness and ability. It develops culture, art, customs and other aspects on the basis of the theme film of the unit, and actually completes the homework. Teachers give one-to-one guidance or group classified guidance. (5) Presentation (group/individual). Presentation emphasizes that students act to show themselves, improve their

English application ability, enhance their ability to think independently and try to explore, and develop their cross-cultural communication awareness and literacy.

Reflective Classroom: After class, the teacher made an evaluation and gave the feedback to the students in time. At the same time, the excellent works displayed in practice should be sorted out and shared with the classmates. In addition, the research team would collectively carry out critical teaching reflection, summarize the shortcomings of each classroom implementation, optimize the teaching program and micro-class design and production. Students would conduct timely self-examination after class, take a comprehensive view of their own learning situation in combination with peer review and teacher evaluation, make a good record of learning, conduct deep reflection on learning, strengthen the consolidation of existing knowledge, and realize the individualized application and expansion of learning.

DATA ANALYSIS AND DISCUSSION

The data for this current research was collected electronically through a Chinese popular website (www.wjx.cn). Students were very familiar with this website and could use it via their self-phones and laptops. Internet were everywhere and had a very easy access to students in the two campuses of ZYUFL. In addition, the researcher utilized the Microsoft Excel and Statistical package for Social Sciences (SPSS) to show statistical distributions if this research. Descriptive analyses, such as frequencies and percentages, were adopted in this study for comparative studies.

Data analysis of reflective reports of students are conducted through open source coding, and for its validity, the researcher and two assistant researchers did the coding independently at first and then adjourned an inter-coding session. After the several debates among the three coders, the finalized results of coding were listed as follows.

Table 2: Results of Coding -- Students' Perception of O2O Blended Learning

Category	Code	Example
Perception of O2O blended learning. There were several ways in which the students expressed their perception of the autonomous learning. The codes created within this category specify the students' reactions.	Positive	In short, through this semester's study, I clearly found that my self-learning ability has improved significantly, and I have made some progress in speaking on stage.
	Negative	However, as far as I can see, I think the new style was less helpful.
	Favorite part	I can get access to the reference materials easily online.
	Less favorite part	what I dislike most is that there are always some members who are unwilling to take participate in activities but just enjoy the final results.

Most students of the two A classes thought positively of the O2O blended learning in the integrated English Class. However, seven students of C7 stayed negative towards the O2O blended learning. Six students remained neutral and made no further comments about it. As the periodical assessment was put online, it allowed automatic scoring and made it easier to save the file of scores. Students could also get in touch with their scores easily. Reference materials were also available to them in the online data, which engaged students out of class. Moreover, flexible access from home and campus made it easier for students to adjust study plans. The teacher's online office hour was also warmly welcomed by the students who used to at a loss when confronting with problems in the middle of learning a certain theme. The goal-setting and coaching approaches adopted by the teacher extended the online guidance to out-class environment. Moreover, the email and messaging in WeChat group were maximized to extend the classroom experiences. Problems identified in the feedback of students included sudden technological breakdown in the online platform, delayed response and the gap between the teacher and the technological staff. Moreover, team learning was not easy for some students. Group dynamics varied greatly due to different personalities.

Table 3 Percentage of Students' Perception

	Positive	Negative
A5	94%	6%
A6	97%	3%
C7	62%	21%

The results were supplemented by the teacher's observation. The observation logs showed that A5 and A6 were

very active in classroom activities. A5 was good at doing presentation and designing their own projects. A6 was adept in reading discussion and writing assignment. According to the mid-term exam results, the score of A6 stayed ahead. C7 was not so interactive as the other two classes. But three groups of C7 kept learning very hard. Based on their group's name, it's obvious that they were targeting CET-4 in June, 2019. The rest three groups stayed aloof towards various kinds of activities. One of the three groups felt excited at the very beginning of the semester, and then cooled down after one month. Their attitude was mostly passive and could not keep up with the study neither online nor offline. This partly was because of their past learning habits and partly was owing to the inconsistency in teaching between the freshman year and the sophomore year. Students needed time to adapt themselves to new teaching mode. It is suggested that if the O2O blending learning could be put into practice since the very beginning of the freshman year, the effect could be much better.

Table 4 Students' Reflection of Most Improved Areas

Category	Code	Example
Most improved areas	Speaking	Because of my teacher, I made progress on my oral English. One of my friends who come from America told me that my spoken English was getting better and better. He can understand me easier than one year ago.
	Listening	Online preview of classes and the micro-lecture help me a lot, and because we need to bring up questions towards other groups' presentation, we have to listen carefully. My listening ability has improved a lot out of my surprise.
	Adaptation	This semester, the new study mode, the new learning environment, let me felt a little uncomfortable. But in the end, more was new experiences, new gains, new friends. The flexible learning pattern, let me have a cleverer understanding of my own learning progress.
	Motivation	It opens up a new path for English learning and enables team members to get to know each other better in the process of communication. It also motivates us to learn from the excellent people around us and make progress together.
	Expansion	Passing CET6 was not the ultimate goal. I want to try other E nglish translation certificates and challenge myself.

According to students' reflective reports, there were several distinctive areas: speaking ability, listening ability, learning adaptation, learning motivation and out-class expansion. Most students from A5 and A6 enjoyed the three-steps O2O blended learning in the integrated English class. They felt a great improvement in terms of self-confidence and motivation both in class and outside class. Presentation was a golden opportunity for them to practice their listening and speaking abilities. Three students mentioned life-long learning in their reflective reports, which demonstrated the usefulness of O2O blended learning in developing students' autonomy in learning. Nevertheless, things in C7 went in a different direction. Three teams tried to catch up with peer's progress, but they were comparatively in short of language proficiency. Due to a lack of English proficiency, they met obstacles from time to time. As for the rest three teams, they went their own ways without discipline, for example, more than ten students would be late for every class. Three students never brought the textbook or the notebook to class, not to mention take part in the activities.

Table 5 Students' Suggestions of O2O Blended Learning

Possible suggestions.	Technological Support	I hope that the Network Information Service Center could be more responsible and replied our puzzles in time.
	App Upgrade	Compared with other apps in the market, our university's app was out of date.
	Regulations	We should make regulations in this regard, which can prevent some people from being lazy.
	Richer ways of teaching	Different teaching methods can be adopted to lead the students into the classroom, such as playing some video related to the text in class.

Given the full freedom of writing anonymously online, students were very active in giving their opinions and suggestions. As both a researcher and a teacher, it's really inspiring to hear students' voices. When designing the class activities and preparing for class materials, considering students' real needs and different requirements were of great help. As for the technological support and app upgrade, it was reflected the technological deficiencies in ZYUFL. On one hand, the educational online platform broke down from time to time, which made a great impact on students' motivation of study online; and sometimes students' online test scores were also influenced by that. On the other hand, whenever problems appeared, as the teacher was not familiar with the technological knowledge, the process went through the teacher to the technological service center and then went back to students, which cost a lot of time. More opportunities for teachers' training and the upgrade of facilities and networks should be taken into seriously consideration for the top administrative level. Another aspect that worthy of attention was that students of C7 suggested to play games, watch videos and listen to music more frequently in the class. The research team discussed about it and concluded that students of C7 was unable to overcome their study inertia and was in favor of entertaining learning methods more. To help them overcome their laziness in study, peer tutoring and team learning were more effective than didactic lectures. More importantly, they needed help for the development of their learning goals.

Table 6 Online Data

Class/Online data (average)	Number of participations in the course online seminar	Number of participations in the online questionnaire	Online time/hr.	Number of micro-lecturers learned	Number of submissions for online testing
A5	168.5	9.5	2052	114	20
A6	265	10.5	5996.5	114	16
C7	100	8	1309	60	10

The online education integrated platform of ZYUFL included data of students' performance from various aspects. The research team decided five most important ones in alignment with the research purpose. From table 6, it was safe to conclude that A5 and A6 excelled C7 in terms of all these five areas. Students in A class paid more attention to their own performance both online and offline. Students in C class focused more on entertainment and leisure. It was in great alignment with the researcher's observation that C7 showed higher motivation in "self-awareness" cycle instead of the other two.

Table 7 The Mid-term Exam and Final Exam Scores

Class/ Scores (average)	Mid-term Exam Scores	Final Exam Scores
A5	77	88.5
A6	81	93.5
C7	40.5	50.5

Exam scores were in alignment with the online performance of students. The data were also consistent with the observation logs. A6 was good at writing assignment and reading analysis, and reading and writing had the biggest proportion in the mid-term exam and final exam, that's explained why A6 gained higher marks in the two exams. On the other hand, A5 was creative. A good case in point was the design of an organic house by themselves. Several groups were very innovative and one group was outstanding with a hand-drawn model. C7 was interested in role playing related with the textbook. Though they were not good at English, they made interviews with some foreign friends in Unit 7 about self-image and cosmetic surgery. Their interpersonal skills and abilities were not hindered by their not-so-fluent English.

Based on the feedback from the students of the three classes in their reflective reports and online data, it was easily seen that the O2O blended learning based on flipped classroom in the integrated English class was more suitable for students of A5 and A6. A5 was good at creating something new while A6 was good at academic assignments. Moreover, the teachers of this research team analyzed the reasons for the short online time, the low number of submissions for online tests and the low participation rate of C7. The suggestions provided by the students show that the students in Class C like entertaining learning methods such as movies, games, and songs. They had a strong fear of systematic online and offline courses and could not control their learning inertia. This kind of students should be guided correctly, and their laziness and learning inertia should be controlled through goal setting and detailed tasks, teamwork and encouragement.

LIMITATIONS

The research attempts to assess and analyze the student's perception towards O2O blended learning in ZYUFL, China. The limitation of this study is that it adopts the convenient sampling method. However, this sampling method is suitable for this study to fulfill the research objectives. Another limitation of this study is that the sample size is not enough to represent all students of CIB, ZYUFL.

CONCLUSIONS

Based on the framework of action learning, this study takes 130 students from three classes as samples and conducts an action research of O2O blended learning in the integrated English class. Most students can complete the tasks of pre-class preparation, in-class interaction and post-class reflection according to O2O blended learning requirements based on the flipped classroom. However, based on the quantitative data analysis of online learning and the qualitative analysis of observation logs and reflection reports, the researcher found that students in class A and class C were different in their perception towards O2O blended learning, such as the focus on topics, learning autonomy and learning styles. Therefore, students' differences should be put into consideration when in the preparation of materials. Yet, it can be concluded that the O2O blended learning based on flipped classroom in the integrated English class was the practice of innovative teaching mode and it created interactive classes of integrated English. Suggestions were more training opportunities should be provided to teachers, and technological and network environment upgrade should be kept up with the educational reform in ZYUFL. If the O2O blended learning could be put into practice at the very beginning of freshman year, the effect might be much more significant.

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AN INVESTIGATION ON THE ROLE OF PERCEIVED EASE OF USE, PERCEIVED USE AND SELF EFFICACY IN DETERMINING CONTINUOUS USAGE INTENTION TOWARDS AN E-LEARNING SYSTEM

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ABSTRACT

There is a paradigm shift in the way organisations impart training and development to its employees with the advent of e-learning system. The study aimed to understand the role of perceived ease of use, perceived use and self efficacy in determining the continuous usage of an e-learning system among employees of software companies. The study also tried to understand the mediating role of learner satisfaction and the moderating role of gender in the relationship between perceived ease of use, perceived use and continuous usage intention. The data was collecyed from 250 employees in the Information Technology Industry, who had done atleast a course in the e-learning platform. The results show that the relation between perceived usefulness and behavioural intention, perceived ease of use and behavioural intention and self efficacy and behavioural intention are all mediated by e-learner satisfaction. This implies e-learner satisfaction has to be enhanced if the continuous usage intention is to be improved.

Keywords: e-Learning; Continuous Usage Intention; Satisfaction; Perceived Ease of Use; Perceived Usefulness; Self Efficacy; Gender.

1. Introduction

There is an ever increasing demand for knowledge workers who are capable of higher-order thinking and reasoning to solve intricate problems in the work place. This again results in a need to build more cost-effective and efficient workplace learning environments to meet both individual and organizational objectives, requiring organizations to educate and train employees at multiple sites and times **(**Ong & Lai, 2006**).** The number of e-learning programs implemented in a corporate setting has increased exponentially over the last few years and e-learning has become a major form of training and development within organizations (Ho & Kuo, 2010).

E-learning refers to any kinds of the use of electronic devices for learning purpose. The benefits of e-learning are numerous: the participants can access the courses at their convenient time, at the place they feel comfortable, with asynchronous interactions discussion can stay more on-track, and people can get a chance to craft their responses, there are new opportunities for groups to work together by creating shared electronic conversations and discussions, etc. (Liaw & Huang, 2013).

Understanding learners' attitudes toward e-learning is a critical issue for improving e-learning usage (Liaw, 2008).The real success of implementation of e-learning system results only when there is a continued usage of the system by the employees. This study tries to analyse and figure out how the process of behavioural intention to continuously use e-learning system happens, so that the results could be used to formulate strategies to improve the intention to continuously use the e-learning system among employees.

2. Theoretical development

2. 1. The theory of planned behaviour

The theory of planned behaviour postulates that a person's intention to perform or not to perform behaviour is the most important immediate determinant of that action. According to this theory intentions are functions of three basic determinants: attitude toward the behaviour, subjective norm and perceived behavioural control. The theory also assumes that the relative importance of the factors depends in part on the intention under investigation. So, to analyse behavioural intention of employees towards e-training system, attitude toward the behaviour and perceived behavioural control gains more importance.

Attitude towards behaviour is determined by accessible beliefs about the consequences of the behaviour, termed behavioural beliefs. It is determined by the person's evaluation of the outcomes associated with the behaviour and by the strength of these associations. In e-learning context the attitude towards the behaviour can be measured in terms of perceived usefulness and perceived ease of use.

Perceived behavioural control is a function of beliefs about the presence or absence of factors that facilitate or impede performance of behaviour. The more the required resources individuals think they possess and the fewer obstacles they anticipate, the greater will be the perceived control over the behaviour. These control beliefs lead to the perception that one has or does not have the capacity to carry out the behaviour. In e-learning context the Perceived behavioural control can be measured in terms of self efficacy.

2.2. Moderating effect of gender
Gender differences also play an important role in e-learning. Women and men differ in their decision-making processes regarding acceptance and usage of e-learning. This implies that efforts should be made to examine gender differences in e-learning to better understand how gender influences learners' attitudes towards e-learning, predicting how learners will respond to it, and then utilizing it (Ong & Lai, 2006). Gender can have moderating effect on relationship between attitudes and continuous usage intention.

2.3. Mediating effect of E-Learner satisfaction
It is obligatory on part of the organizations should ensure that the employees are satisfied with their e-learning system, only then employees will have the intention to continually use the e-learning system and also encourage their peers to use e-learning setup. After taking up e learning courses employees should be happy about their decision and consider that the courses have satisfied their needs (Sun, Tsa, Finger, Chen, & Yeh, 2008). Employees attitudes affects e-learning satisfaction which in turn has a positive effect on e-learning continuance intention (Roca, Chiu, & Martinez, 2006; Lee, 2010). Many studies have examined users' e-learning continuance intentions and found that they were strongly dependent on the satisfaction users felt regarding the use of an e-learning system (Lin and Wang 2012; Zhang, De Pablos, & Zhang, 2012).

Hence it is inferred that e-learner satisfaction mediates the relation between employee attitudes and continuous usage intention.

2.4. Perceived usefulness
Davis (1989) has defined perceived usefulness as the degree to which a person believes that using a particular system would enhance his/her job performance. Only if employees perceive that using the e-learning system enhances work efficiency, job outcome and learning efficiency, competence and productivity, they will possess positive behavioural intention to use it (Chen, 2010). Perceived usefulness while using the e-learning system has a positive effect on behavioural intention to continually to use the system (Lee, 2010; Liaw, Hsieu, & Chen, 2007; Liaw, 2008). Gender moderates the relation between perceived usefulness and continuous usage intention. Meanwhile E-Learner satisfaction is mediating the   relationship between perceived usefulness and continuous usage intention of an e-learning system. Hence, it is hypothesized as,

H1a: Perceived usefulness has influence on continuous usage intention.
H1b: Perceived usefulness has influence on e-learner satisfaction
H1c: E-learner satisfaction mediates the relation between perceived usefulness and continuous usage intention.
H1d: Gender moderates the relation between perceived usefulness and continuous usage intention.

2.5. Perceived ease of use
Davis (1989) has defined perceived ease of use as the degree to which a person believes that using a particular system would be free of physical and mental effort. When a person perceives that performing an action is easy then he would develop positive attitude towards it. An employee should feel that it will be easy for him to become skilful by using e-learning systems. He should consider that learning to use the e-learning system is not a tedious process. On the whole the employees should believe that using e-learning system is effortless, only then they would develop positive intention to use e-learning system (Sun, Tsa, Finger, Chen, & Yeh, 2008). Perceived ease of use while using the e-learning system has a positive effect oncontinuous usage intention (Lee, 2010; Liaw, Hsieu & Chen, 2007). Researchers have revealed that perceived ease of use has an important direct effect on behavioral intention to use an e-learning system (Terzis and Economides 2011).

Gender moderates the relation between perceived ease of use and continuous usage intention. Meanwhile E-Learner satisfaction is mediating the relationship between perceived ease of use and continuous usage intention towards an e-learning system. Hence, it is hypothesized as,

H2a: Perceived ease of use has influence on continuous usage intention.
H2b: Perceived ease of use has influence on e-learner satisfaction
H2c: E-learner satisfaction mediates the relation between perceived ease of use and continuous usage intention.
H2d: Gender moderates the relation between perceived ease of use and continuous usage intention.

2.6. Self efficacy

Roca (2006) has defined self efficacy as the degree to which an individual is confident that he/she can perform a specific task or achieve a specific goal. When an employee feels that he is capable of making use of the e-learning system, he will have positive intention to make use of the system. Behavioural intention to use e-learning system will be influenced by the perceived self efficacy (Liaw, Hsieu & Chen, 2007). Gender moderates the relation between self efficacy and continuous usage intention. Meanwhile E-Learner satisfaction is mediating the relationship between self efficacy and continuous usage intention to use e-learning system. Hence, it is hypothesized as,

H3a: Self efficacy has influence on continuous usage intention.
H3b: Self efficacy has influence on e-learner satisfaction
H3c: E-learner satisfaction mediates the relation between self efficacy and continuous usage intention
H3d: Gender moderates the relation between self efficacy and continuous usage intention.

3. Methodology

3.1. Instrument

A questionnaire instrument was developed for this study. These scale items were developed based on the existing literature. The four items to measure perceived usefulness are adapted from the study of Ong and Lai (2006).The three items to measure perceived ease of use as documented by Lee and Lee (2008) are used. The four items to measure self efficacy are adapted from the work of Liaw and Huang (2013). The five items to measure e-learner satisfaction are adapted from Sun, Tsai, Finger, Chen, and Yeh (2008). The six items to measure behavioural intention as designed by Li (2013) are used for this study. All variables are subjectively measured using the five-point Likert Scale, with 5 being ''Strongly Agree'' and 1 being ''Strongly Disagree.''

3.2. Data Collection

The Survey is conducted in Chennai, TamilNadu. The participants were employees of various software companies, who have undergone at least one e-learning course through their companies' e-learning system. 250 such participants have responded to the questionnaire.

4. Data Analysis

A correlation matrix of independent variables is presented in table 1. The extent of inter correlation among independent variables is not very high implying that results of further analysis are not spurious.

Table I Intercorrelation of Independent Variables

Variables	1	2	3
1 Perceived usefulness	1	0.620[**]	0.418[**]
2 Perceived ease of use		1	0.587[**]
3 Self efficacy			1

Multiple regression analysis is carried out to test the hypotheses that comprise the direct effects of perceived usefulness, perceived ease of use and self efficacy on continuous usage intention. The analysis has revealed that perceived usefulness, perceived ease of use and self efficacy are found to have significant impacts on continuous usage intention towards an e-learning system. The standard beta values and the R^2 values are as shown in table 2.

Table II Multiple Regression on Continuous Usage Intention

Variables	Standard Beta	t-value
Perceived usefulness	0.315	7.484[**]
Perceived ease of use	0.374	7.926[**]
Self efficacy	0.335	8.219[**]
R^2	0.734	
Adjusted R^2	0.731	

*** p value less than .001

To test the mediating effect of e-learner satisfaction, the influence of independent variables on e-learner satisfaction is to be confirmed. So, multiple regression analysis is carried out to test the direct effects of

perceived usefulness, perceived ease of use and self efficacy on e-learner satisfaction. The standard beta values and the R^2 values are as shown in table 3.

Table III Multiple Regression on e-Learner Satisfaction

Variables	Standard Beta	t-value
Perceived usefulness	0.265	5.774**
Perceived ease of use	0.373	7.236**
Self efficacy	0.347	7.792**
R^2	0.682	
Adjusted R^2	0.679	

*** p value less than 0.001

The independent variables of the study are having significant influence on both continuous usage intention and e-learner satisfaction. Now, a mediation analysis is done to detect whether the relation between perceived usefulness, perceived ease of use and self efficacy and continuous usage intention are mediated by e-learner satisfaction. The mediation effect of e-learner satisfaction on the relation between independent variable and continuous usage intention is measured in SPSS with INDIRECT macro designed by Preacher and Hayes (2008). The strengths of the mediated paths are shown below in table 4.

Table IV Mediated paths

Tested Path	Path a	Path b	Path c	Path c'
PU-SAT-CUI	0.6424 (0.0487)**	0.8631 (0.0259)**	0.6925 (0.0465)**	0.1380 (0.0259)**
PEOU-SAT-CUI	0.8062 (0.0463)**	0.8428 (0.0298)**	0.8391 (0.0446)**	0.1596 (0.0324)**
SEF-SAT-CUI	0.6958 (0.0480)**	0.8929 (0.0279)**	0.7105 (0.0477)**	0.0892 (0.0287)**

Standard errors are in parenthesis   *** p value less than 0.001

The hypothesis H1c which states that the relation between Perceived usefulness (PU) and Continuous Usage intention (CUI) is mediated by e- learner satisfaction (SAT) is tested to detect whether e-learner satisfaction is the one which accounts to the extent of relation between perceived usefulness and continuous usage intention. The result of testing can be viewed in table 4. The figure 1 depicts that there lies a mechanism in which perceived usefulness causes e-learner satisfaction which in turn causes continuous usage intention.
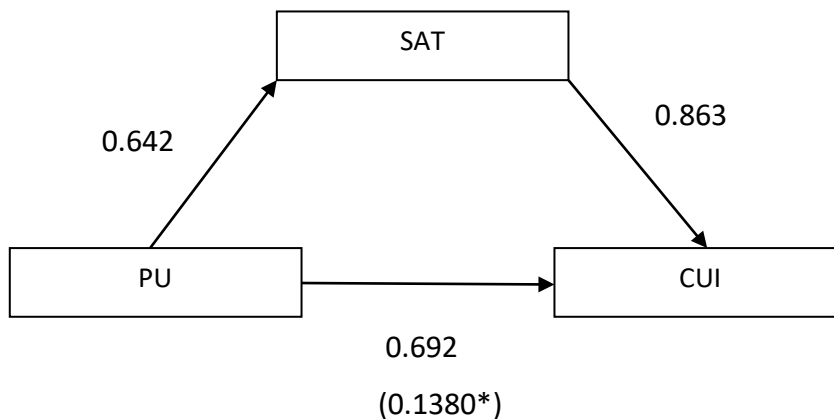
Figure I Mediating effect of e-learner satisfaction on the relation between perceived usefulness and continuous usage intention

The hypothesis H2c which states that the relation between Perceived ease of use (PEOU) and Contiuous Usage Intention (CUI) is mediated by e- learner satisfaction (SAT) is tested to detect whether e-learner satisfaction is the one which accounts to the extent of relation between perceived ease of use and continuous usage intention. The result of testing can be viewed in table 4.
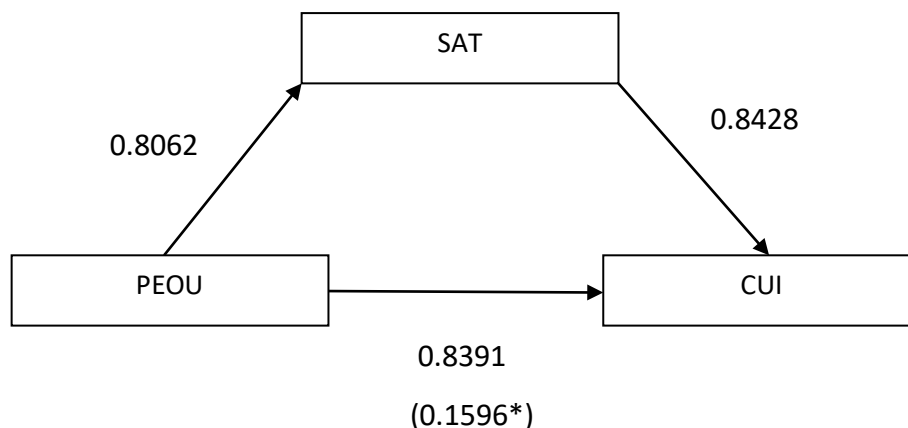
Figure II Mediating effect of e-learner satisfaction of the relation between perceived ease of use and behavioural intention

The figure 2 depicts the fact that there lies a mechanism in which perceived ease of use causes e-learner satisfaction which in turn causes continuous usage intention

The hypothesis H3c which states that the relation between self efficacy (SEF) and Continuous Usage Intention (CUI) is mediated by e- learner satisfaction (SAT) is tested to detect whether e-learner satisfaction is the one which accounts to the extent of relation between self efficacy and continuous usage intention. The result of testing table 4.
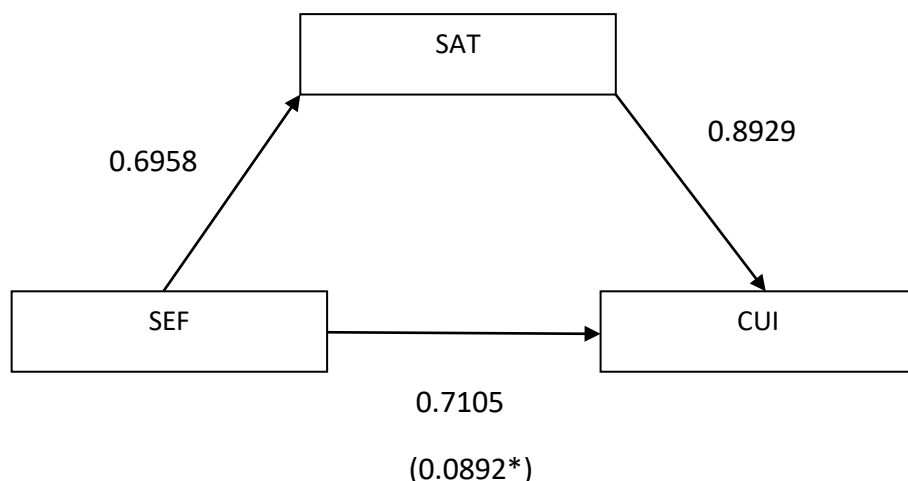
Figure III Mediating effect of e-learner satisfaction on the relation between self efficacy and continuous usage intention

The figure 3 depicts the fact that there lies a mechanism in which self efficacy causes e-learner satisfaction which in turn causes continuous usage intention

The moderation analysis is done to detect whether the relation between perceived usefulness, perceived ease of use and self efficacy and continuous usage intention are different for male and female. The moderation effect of gender on the relation between independent variables and continuous usage intention is measured in SPSS with MODPROBE macro designed by Hayes and Matthes (2009). The p-values of influence of interaction between gender and independent variables on continuous usage intention are given in table 5.

Table V Moderated paths

Moderation Paths	Significance value (p-value)
PU-BI	0.5521
PEOU-BI	0.0960
SEF-BI	0.4553

On testing hypothesis H1b whether gender moderates the relation between perceived usefulness and continuous usage intention, it has been inferred that the influence of interaction between gender and perceived usefulness on continuous usage intention is not significant. The p value of this interaction effect on behavioural intention is given in table 4. A line graph between perceived usefulness and behavioural intention is sketched to graphically test the moderation effect of gender. The line patterns for male and female can be viewed in figure 4.
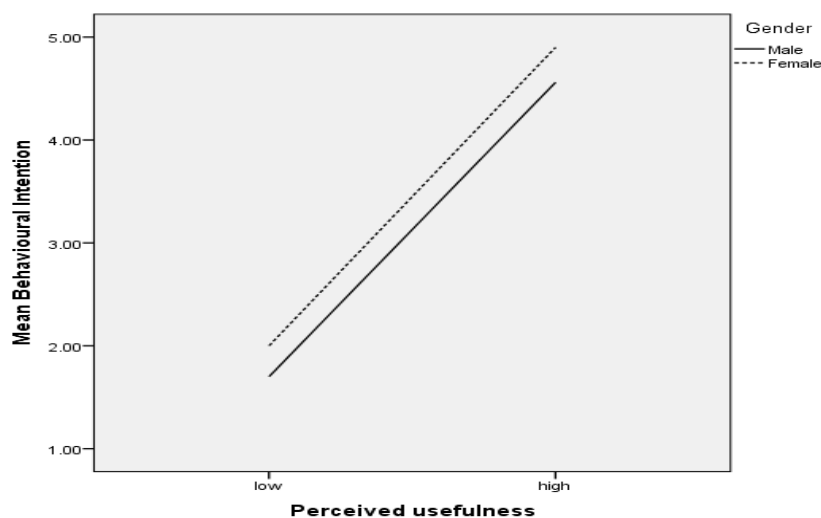
Figure IV Relation between PU and BI with lines defined by gender

The hypothesis H2b whether gender moderates the relation between perceived ease of use and continuous usage intention is tested and it is inferred that the influence of interaction between gender and perceived ease of use on continuous usage intention is not significant. The p value of this interaction effect on behavioural intention is given in table 4. A line graph between perceived ease of use and continuous usage intention is sketched to graphically test the moderation effect of gender. The line patterns for male and female can be viewed in figure 5.
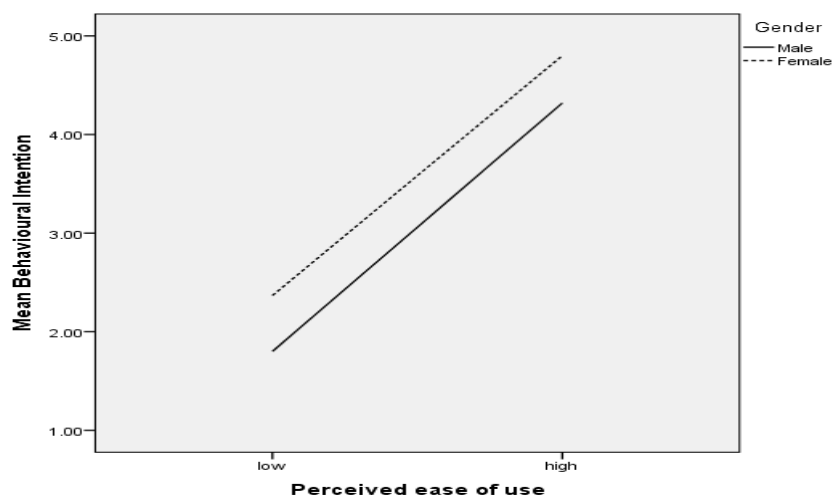
Figure V Relation between PEOU and BI with lines defined by gender

The hypothesis H3b is tested to check out whether gender moderates the relation between self efficacy and continuous usage intention and it has been inferred that the influence of interaction between gender and self efficacy on continuous usage intention is not significant. The p value of this interaction effect on continuous usage intention is given in table 4. A line graph between self efficacy and continuous usage intention is sketched to graphically test the moderation effect of gender. The line patterns for male and female can be viewed in figure 6.
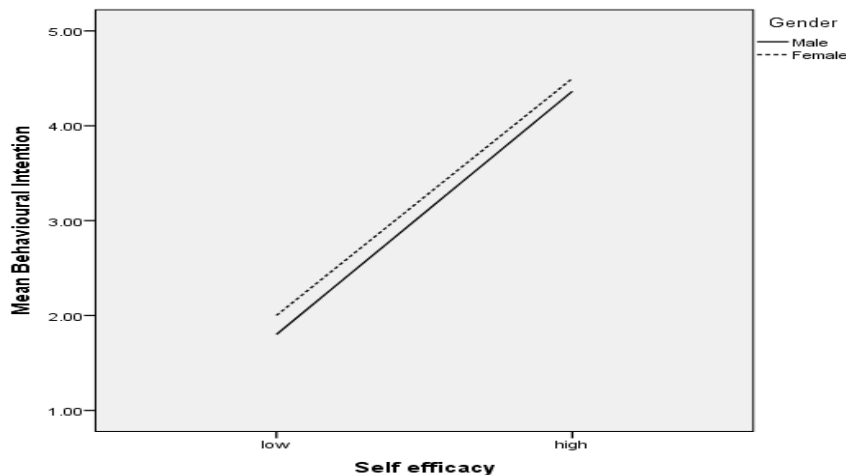
Figure VI Relation between SEF and BI with lines defined by gender

5. Discussion

From table 1 it is understood that the three variables considered for the study namely perceived usefulness, perceived ease of use and self efficacy are different from one another, they are not highly inter-correlated which assures that the further analysis of those variables are valid.

From the results of multiple regression on behavioural intention in table 2 it is obvious that perceived usefulness, perceived ease of use and self efficacy are having significant influence on behavioural intention, since the p-values of the standard beta values are all less than .05. These three variables together explain about 73.4% of the variability in behavioural intention. Thus perceived usefulness, perceived ease of use and self efficacy are important determinants of behavioural intention of employees to continually undergo courses in e-learning system.

The results of multiple regression on e-learner satisfaction in table 3 shows that perceived usefulness, perceived ease of use and self efficacy are having significant influence on e-learner satisfaction, since the p-values of the standard beta values are all less than .05. These three variables together explain about 68.2% of the variability in continuous usage intention. Thus perceived usefulness, perceived ease of use and self efficacy have a strong relation with e-learner satisfaction. Since these three factors influence both the continuous usage intention and e-learner satisfaction, mediation can be tested.

In table 4 the first hypothesized (H1c) pathway from perceived usefulness to e-learner satisfaction and then to continuous usage intention is supported. E-learner satisfaction has partially mediated the effect of perceived usefulness on continuous usage intention. The direct effect of perceived usefulness on continuous usage intention is 80.07% less than total effect when e-learner satisfaction is included. Thus it is inferred that the extent of relationship between perceived usefulness and continuous usage intention is determined by e-learner satisfaction.

In table 4 the second hypothesized (H2c) pathway from perceived ease of use to e-learner satisfaction and then to continuous usage intention is supported. E-learner satisfaction has partially mediated the effect of perceived ease of use on continuous usage intention. The direct effect of perceived ease of use on continuous usage intention is 80.79% less than total effect when e-learner satisfaction is included. Thus it is inferred that the extent of relationship between perceived ease of use and continuous usage intention is determined by e-learner satisfaction.

In table 4 the third hypothesized (H3c) pathway from self efficacy to e-learner satisfaction and then to continuous usage intention is also supported. E-learner satisfaction has partially mediated the effect of self

efficacy on continuous usage intention. The direct effect of self efficacy on continuous usage intention is 87.44% less than total effect when e-learner satisfaction is included. Thus it is inferred that the extent of relationship between self efficacy and continuous usage intention is determined by e-learner satisfaction.

Thus it is proved that the relation between perceived usefulness and continuous usage intention, perceived ease of use and continuous usage intention and self efficacy and continuous usage intention are all mediated by e-learner satisfaction. This implies e-learner satisfaction has to be enhanced if the final outcome continuous usage intention is to improved From table 3 it is inferred that of all the factors which influence e-learner satisfaction the most influential factor is perceived ease of use with standard beta value of 0.373, the next influential factor is self efficacy with standard beta value of 0.347 followed by perceived usefulness with standard beta value of 0.265.

As shown in table 5 the p-values of the interaction effect between perceived usefulness and gender on continuous usage intention is 0.5521; interaction effect between perceived ease of use and gender on behavioural intention is 0.0960; interaction effect between self efficacy and gender on behavioural intention is 0.4553. All these values are greater than 0.05. This implies that gender has no moderating effect on any of the relation between the independent variables and behavioural intention. In figures 1,2 and 3 the pattern of lines for male and female are almost similar and are not poles apart which again confirms that the direction and strength of the relation between perceived usefulness and continuous usage intention, perceived ease of use and continuous usage intention and self efficacy and continuous usage intention are not determined by gender.

Thus by improving perceived ease of use, self efficacy and perceived usefulness, e-learner satisfaction can be improved which in turn would enhance continuous usage intention to undergo more courses through e-learning system.

6. Conclusion
From the research it is obvious that Perceived usefulness, Perceived ease of use, Self efficacy have significant influence on continuous usage intention of e-learning system. Gender is not a determinant of degree of influence of these factors on continuous usage intention. The relation between these independent variables and continuous usage intention is partially but strongly mediated by e-learner satisfaction. So e-learner satisfaction is a major determinant of continuous usage intention towards e-learning system. The e-learner satisfaction in turn is highly influenced by perceived ease of use, followed by self efficacy and perceived usefulness.
Therefore to improve the continuous usage intention of employees towards the e-learning system, e-learner satisfaction has to be improved by improving employees' perceived ease of use, self efficacy and perceived usefulness.

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ONLINE LEARNING READINESS: PERSPECTIVE OF STUDENTS ENROLLED IN DISTANCE EDUCATION IN GHANA

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ABSTRACT

Significance of online learning is widely recognized as a means to enhance accessibility and quality of teaching-learning process in the world. In Ghana, there is a trend to broaden the use of online learning through the distance education programme. However, issues of student readiness for online learning at the distance education mode has been left unattended to. Therefore, the current paper has its objective to explore readiness of distance education students for online learning. Descriptive research design was employed for the study. A multistage sampling procedure was used to select three regions in Ghana and six study centers from the regions out of which 306 first year students enrolled in distance education programme in the University of Cape Coast participated in the study. A five-point Likert type of questionnaire was used for the data collection. Data was analyzed by using descriptive statistics specifically mean and standard deviation as well as inferential statistics thus independent sample t-test and standard multiple linear regression. Findings from the study suggest that distance education students had a positive attitude towards online learning. Further, it was also revealed that students possessed good self-regulated learning, collaborative and information communication and technology skills relevant for online learning through the distance education mode. Management of Universities running distance education specifically the university of Cape Coast, College of Distance Education (CoDE) should direct their focus to the formulation of appropriate and operational distance education policies to guide the college towards successful implementation of online learning since their target audience (students) have positive attitude toward online learning.

Keywords: Online learning, Distance Education, Self-regulated learning skills, Collaborative skills

INRODUCTION

Distance education globally has witnessed significant transformation because of the Internet. Recently, one can talk of the paradigm shift from traditional face to face to an electronic mode of learning. The convention of on-site interaction has prevailed ever since communities approved of the model that schools and classes use today to facilitate education (Brown, 2013). The common practice in the world has always been a classroom with one or more teachers and students, with both groups having meetings in physical structures and in real time. With the onset of computer technology and the internet, the traditional setup of learning is evolving into a form mostly referred to as "Online learning. Clark and Mayer (2011) define online learning as "provision of instruction via digital device such as a computer or mobile device that is thought of to support learning". Hogan and Kedrayate (2010) opined that online learning is a blended approach that combines online and face-to-face interaction. There are several devices and platforms that can be used as tools for online learning. These include Internet, satellite, intranet, extranet, satellite broadcast, audio/video tape, CD–ROM, interactive TV and many others (SØrebØ, Halvari, Gulli & Kristiansen, 2009). Distance education has always grown on the wings of technology worldwide. Several scholars have traced the evolution of several technological platforms for teaching today to distance education since its inception (Garrison, Taylor & Swannell, 2001; Schultze, 2011). The first generation normally referred to as the era of correspondence courses, was championed by the print devices or technology. The second era was noted of as an era limited by media courses (postal mailing, strengthened with audiotape and television broadcast). The third phase was known to be an era ruled by personal computer and multimedia applications such as print, audio and video-conferencing which offer synchronous communication (Anderson & Dron, 2011; Schultze, 2011). The fourth era was traced to the influence of the internet and it is based on the use of world-wide web (www) to provide both synchronous and asynchronous delivery. With the prevalence of internet usage, online learning has become widely accepted and many universities are using it to support teaching and learning (Kanuka & Anderson, 2007). Deng and Tavares (2013) are of the opinion that the latest developments of internet technologies have caused universities investing considerable resources in online learning systems to support teaching and learning. According to the Giga Information Group (GIG), about 75% of the 129 topmost United States universities make use of online learning

systems (Wang & Wang, 2009). This innovation that started in developed countries is rapidly becoming a global phenomenon. Online learning has recently become more popular in many developing countries (Alkhalaf, Drew, AlGhamdi & Alfarraj, 2012). Tagoe (2012) asserts that though the implementation of online learning in developing countries, especially in Africa, is slow compared to that of countries in the western world, the last decade has seen proactive efforts on the part of university administrators to roll-out online learning strategies in order to map up with their counterpart countries in the developed world. Universities and other institutions of higher learning adopt and implement online learning because of several benefits they can obtain from it. Online learning offers diverse ways of learning resulting in drastic changes in educational practice (Brown, 2013). For instance, the idea of conventional education system does not augur well with the current trend of lifelong learning in which the roles of teachers, students and curriculum are changing (Marold, Larsen & Moreno, 2000). Online learning becomes mostly important in situations where there is no slot for conventional learning (Horn & Staker, 2011). For instance, in small, rural and urban schools which are unable to offer a broad set of courses with highly qualified teachers in certain subject areas. Again, teaching in the traditional classroom is often teacher-centric where the instructor mainly dominates class activities including topic selection, course material delivery, progress assessment and discussions (Baloian, Pino & Hoppe, 2000). But the role of students' communication and interaction in the learning process is a critical success ingredient in contemporary educational paradigms (Brown, 2013).

In Ghana, distance education is now considered as a force capable of contributing to social and economic development in many aspects of the economy (Amoako, 2018). In line with this, universities are exploring ways of adopting Information and Communication Technologies (ICT) and online learning as an alternative method of course delivery, or as a complement to existing approaches (Marfo & Okine, 2011; Jones, 2008). Previous studies conducted in Ghana have shown that initiatives involving ICT integration in teaching and learning in Ghana failed partly because it did not meet the expectation of students (Marfo & Okine, 2011; Dadzie, 2009). The questions that readily come to mind are that; are Ghanaian university students ready to embrace online learning mode? What is their attitude toward online learning? Do they have 'self-regulated skills' that depict their readiness for the online learning? There are no readily available answers to these questions with particular reference to distance education students. This is because most scholars over the years have not paid attention to exploring distance education students readiness for online learning in Ghana but rather on challenges of implementing online learning (Dadzie, 2009; Jones, 2008) accessibility considerations for online learning in Ghana (Boateng, 2015; Coleman 2011), determinants of online learning adoption in universities in Ghana (Ansong, 2015), examining policy guidelines for distance education in dual mode public universities in Ghana (Osei, Dontwi & Mensah, 2013). Unattended are issues of students' readiness for online learning at the distance mode, perceived students' capabilities to collaborate and interact in an online learning environment as well as students' self-regulatory skills necessary for online learning. This study therefore sought to find out University of Cape Coast distance students' readiness, capability to collaborate and interact in an online learning environment and students self-regulated learning skills relevant for online learning. The following research questions were posed to guide the study:

1. What is students' attitude toward online learning in Ghana?
2. What are the students' self-regulation skills that depicts readiness for online learning in Ghana?
3. What is the perception of students' regarding their capability to collaborate and interact in an online learning environment in Ghana?
4. What is the basic skills level of student in ICT for online learning?
5. Which factor(s) predict more of students' readiness toward online learning in Ghana?

LITERATURE REVIEW

The term 'online learning' has been used in different contexts, which includes; distributed learning, hybrid learning and online-distance learning (Maltz et al., 2005). In an online learning environment, different set of tools and technologies are used, for example, internet mediated teaching, web-based education, TV and radio broadcast, virtual classrooms and distributed learning (Rosenblit, 2009). Online learning is seen as flexible and often make use of technologies, this might involve, video conferencing, audio chatting and online discussion (Hrastinski, 2008). The technologies as mentioned give students the opportunity to interact with instructors and other learners in a more flexible way. Online learning refers to the use of information and communication technologies (ICT) in diverse aspects of education to support and improve learning in tertiary institutions. This might take the form of using technology as a supplement to traditional classrooms interaction, online learning or hybrid modes (OECD, 2005). Online learning gives institutions and learners the flexibility when it comes to venue and time of teaching or receiving learning information. Sustaining professional development practices recently calls for involvement of state-of-the-art technologies that aid flexibility of learning (Smedley, 2010). Online learning signals a revolution in teaching and learning which has undeniable impacts on the education system. Voogt and Knezek (2008) opined that

online learning is of critical significance as well as an effective method that should be blended into schools' learning approach. With technology evolving at such a faster rate, it is critical that teachers and learners are equipped with technical skills to manage online learning environment. These technical know-hows are effectively acquired by learning with technology, rather than about technology (Broadley, 2012). Learning with technology does not only depend on technical know-how, but users of technology should also have the interest to use technology as learning tool and teaching platform. Online learning implementation requires expertise, knowledge, physical infrastructure, and psychological readiness. Online learning platforms are mostly well managed and used by people with some level of expertise, knowledge and skills. In addition to teachers' ICT knowledge and skills, Broadley (2012) indicates that teachers' perception and attitude towards online learning play a significant role in online learning implementation. However, for some learners as well as instructors, online learning foreign to the traditional teaching style, and a number of teachers feel that technology deprives them of autonomy (Mansour & Mupinga, 2007). It is therefore necessary to examine students who are mostly the beneficiaries of online learning perception toward technology usage and their readiness for online learning.
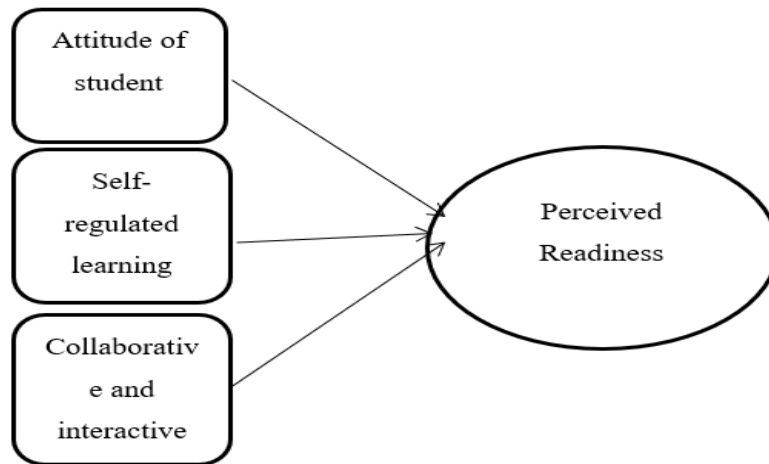
Figure 1 Source: Authors construct

The conceptual framework (Figure 1) above explains how important variables such as student attitude toward online learning, self-regulated learning skills and perceived collaborative and interactive skills predict readiness for online learning (e-learning). Evidence has been shown in literature that students' attitude, in other words if they have a good impression or otherwise toward e-learning tell to a greater extent their acceptability or otherwise of online courses (Ansong, 2015). Again, when students have adequate skills and techniques for self-regulated learning, they tend to develop interest and subsequently apply for online courses (Wandler & Imbriale, 2017; Quince, 2013; Pintrich, 2004). The term self-regulation is the regulation of one's thinking and actions (Zimmerman & Schunk, 2011). For example, students may give extra thought to how they learn and the strategies they will need to succeed in college coursework. This model was propounded by Zimmerman (1990) to explain how effective learning takes place. It is a social-cognitive model that conceptualizes effective learning as a cyclical process of evaluating cognitive and motivational processes during academic tasks. The cycle is commonly represented in three phases: planning, performance, and self-evaluation. The planning phase includes setting goals and assessing motivation prior to undertaken a task. The performance phase has to do with online assessment of learning and adapting to task demands. The self-evaluation phase concerns student self-appraisal about the learnable bit and whether their learning style was effective. Self- regulated learners develop the capacity to make adjustments during the self-regulated learning cycle through the use of strategies (Pintrich, 2004). The strategies involve the use of metacognitive, motivational, and behavioural learning strategies (Schunk & Zimmerman, 2007). In terms of metacognitive processes, self-regulated students plan, set goals, organize, self-monitor, and self- evaluate at several levels during the process of acquiring knowledge (Pressley, Borkowski, & Schneider, 1987). In terms of motivational processes, self-regulated learners report high self- efficacy, self-attributions, and task interest (Zimmerman, 1985). In their behavioural processes, self-regulated learners choose, organize, and create surroundings that maximize learning (Henderson, 1986; Wang & Peverly, 1986; Zimmerman & Martinez-Pons, 1986). The implication of this theory for this study has to do with the fact that online learning can be very successful if university students have the skill to take the initiative in understanding their learning needs, establishing learning goals, identifying human and

material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.

Students' ability to collaborate with peers as well as instructors online for learning support also predicts online learning acceptability (Lantolf & Thorne 2006; Vygotsky, 1978). The concept of "collaborative and interactive learning" is largely rooted in Vygotsky's sociocultural theory (SCT) which views learning as inherently a social process activated through the Zone of Proximal Development (ZPD). Vygotsky's sociocultural views highlight how learning is mediated in accordance with the context and experiences with peers. This view illuminates the causal relationship between social interaction and an individual's cognitive development. Learning, from the sociocultural perspective, is essentially a social term rather than individual in nature, where interaction constitutes the learning process (Lantolf & Thorne 2006). Social interaction is seen as a prerequisite for the growth and development of cognition (Donato and McCormick 1994), and the physical and symbolic tools that links human interaction cannot be separated from the social environment in which it is carried out (Wertsch 1993). In other words, mental functions are "intertwined with sociocultural determined factors" (Lantolf and Appel 1994, p. 5). Vygotsky (1978) then based his theory on collaborative learning, suggesting that working with a more capable person is pertinent to personal development. Vygotsky focused on the individual powerfully rooted in a collaborative and interactive context and famously made the following observations: learning is first connected on a social level between a learner and other people in his or her environment, and then is internalized by the learner on an individual level. Secondly, learning on the social level often has to do with mentoring provided by more knowledgeable persons, either by adults or peers, who engage in activity with less experienced persons in a process of guidance or collaboration. Thus, learning, with regard to this notion, is "embedded within social events and occurring as a learner interacts with people, objects and events in the environment" (Vygotsky 1986, p. 287). Collaborative learning in the Vygotskian tradition aims at social interaction either among students or between students and a teacher, and essentially assists students in advancing through the Zone of Proximal Development (ZPD), which he defined as: "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky 1978, p. 86).One's ability to perform cognitive tasks independently is premised on the prior social process, as this is regarded as the basic tenet of socioculturalism in which learning is situated within a given context and is influenced by the social and cultural activities one has experienced (Oxford 1997). The implication of this theory for this study is only thought to be that, in order for an effective online distance education and for that matter online learning to be successful, there should exist robust students' collaborative and interactive learning behaviours to complement online instruction. The basic idea is that the more students are able to interact and collaborate in an online learning environment, the better for them to sharpen out their weaknesses as well as creating opportunities for consolidation of knowledge and skills

In summary, theoretical underpinning behind the study appear to suggest that for an online learning programmes to be implemented in the university, student's readiness to apply for such programmes or courses is contingents on the variables in the conceptual model as indicated in Fig.1 above. This study sought to test empirically within the Ghanaian context for decisions regarding policy for online learning through the distance education mode. The review that follows focuses on earlier studies conducted on student's readiness for online learning. Specifically, the review focuses on students' attitude towards online learning, students self-regulated learning skills that depicts their readiness for online learning, student's capability to collaborate and interact in an online learning environment and student's previous knowledge and skill in ICT relevant for online learning.

Literature related to students' attitude toward online learning
Alanazy (2018) investigated the readiness of faculty members for adopting online learning at Aljouf University, a Saudi newly established university. A descriptive research design was used and 156 respondents were asked to respond to a web based questionnaire that begins with eight demographic items and has other four parts; attitude toward online learning, computer self-efficacy, attitude toward technology, and computer anxiety. The results demonstrated that faculty members and students showed positive attitudes toward online learning (M=3.03, SD=0.45). They also showed a slightly high computer self-efficiency (M=2.92, SD=0.40), positive attitudes toward technology (M=3.10, SD=0.33), and a low level of computer anxiety (M=1.05, SD=0.38). Finally, the results revealed that among the demographic variables, only the nationality of the participants and their experience with online learning had a significant effect on their attitude toward online learning. This study paid attention to lecturers of the department, however, the perception of students online learning courses are as important as the courses. In this line, this current study would examine students' attitude toward the idea of online learning. Fageeh (2011) examined the attitude and perception of undergraduate students (at different levels of the English department) regarding their readiness to accept online learning at King Khalid University. Mixed method design was adopted to ascertain the

students and teachers' perception, attitude and readiness to accept it, and factors facilitating or inhibiting online learning. Findings of the study have demonstrated that informants of this study have identified the facilitators and inhibitors of online learning previously recognized by prior research. This shows that students have positive attitude toward the online learning. The study also showed that students are ready to accept technology implementation and so shift to an online learning model of education. This present study will sample from across department and disciplines for wider consultative view point of students on online learning.

Literature related to students' self-regulated learning skills (SRL) and online learning

Wandler and Imbriale (2017) explored strategies for online instructors to promote students' use of self-regulated learning strategies (SRLS) in online courses, which has been associated with positive academic achievement. In other to achieve the aim of the study, the study reviewed extensively, literature on self-regulated learning strategies of students together with Zimmerman's model. Findings indicated that online instructors can help their students with the following strategies; teaching self-regulation strategies, instructing students to get study logs, prompting students to self-regulate, sending text message reminders, scaffolding and prompting students to seek help when the need arises. The researchers recommended that faculty members will need to determine the amount of time they have available to commit to these improvements in the course. The study failed to explore students' level of self-regulated learning but focused on strategies that instructors would utilize to help student self-regulate. This study therefore sought to examine the self-regulated learning skills of students relevant for online learning. Yot-Domínguez and Marcelo (2017) examined whether university students really use digital technologies to plan, organize and facilitate their own learning. Three research questions were crafted for this study. Which technologies do university students use to self-regulate their learning? What self-regulated strategies do they develop using technologies? What profile could be identified among students based on their use of self-regulation strategies with technology? The study made use of descriptive survey design and sampled 711 students conveniently from various universities in the region of Andalusia (Spain). The research data was collected using a questionnaire and data analyzed using mean and standard deviation. The results showed that university students, even when they are frequent users of digital technology, do not use these technologies to regulate their own learning process. Of all the technologies, it was discovered that internet information search and instant communication Apps were those used by students often. Moreover, it was discovered that, the most generalized self-regulation learning strategies were those related to social support. It was further discovered that students differ in their use and frequency of use of self-regulation learning strategies.

Literature related to students' capabilities to collaborate and interact in an online learning environment

Koo (2008) explored collaborative behaviours of students toward online learning. Using descriptive research design, the researcher chose 86 mathematics teachers from 12 secondary schools using proportionate stratified sampling technique. Descriptive statistics, confirmatory factor analysis and structural equation modelling were used to analyse the data. A moderately fit model was generated and able to inform that time constraint and insufficient access to technology such as computer and internet were confirmed to be the two impediments to online collaborative learning as perceived by the teachers.

Literature related to students' skills in ICT as an enhancing factor for online learning

Ansong (2015) explored the technological, institutional and environmental determinants of online learning adoption in the University of Ghana using a multi-stakeholder approach. Another construct (Nature of the course) was added to the traditional constructs of the Technology-Organisation-Environment framework to underpin the study. Eight factors were identified after the review of online learning literature: information technology infrastructure, perceived ease of use, institutional compatibility, assumed benefits, educational partners, competitive pressure, content of the online learning course and online learning curriculum. Using a quantitative survey method, a total of 417 online learning stakeholders in the University of Ghana responded to the questionnaire. The data was analyzed by means of factors analysis, correlation and multiple regression. The findings established that IT infrastructure, institutional compatibility, assumed benefits, competitive pressure, educational partners, content of the online course and online learning curriculum influence student's adoption of online learning. Also, perceived ease use, educational partners and online learning curriculum influenced instructors to accept online learning. On the other hand, IT infrastructure, institutional compatibility, expected benefits are adoption determinant factors for the online learning administrators. The analysis further revealed that online learning was yet to receive a university-wide acceptance and again, a more complex institutional compatibility leads to online learning being less adopted in the institution. Ngamau (2013) investigated individual, organizational and technological factors that contribute to limited success in the rolling out of online learning programmes at Jomo Kenyatta University. A descriptive research design was used whereby 146 faculty members were selected using proportionate stratified sampling strategy from the 7 schools at the University main campus. The main data collection instrument was a questionnaire and the data was analyzed using descriptive

statistics and inferential statistics. Results on individual factors included, computer literacy, frequency of LMS use and adoption. On the organizational factors, the study discovered management support, institutional leadership, school and institution wide online learning strategy, ease of use of the system and ICT infrastructure. Finally, among technological factors, ICT infrastructure, perceived usefulness, output quality and job relevance were discovered. The study recommended that effort to improve online learning acceptance should place emphasis on improving computer literacy.

METHODOLOGY

A descriptive survey research design was employed for this study. The descriptive survey research design is one directed towards determining the nature of a phenomenon as it exists at the time of the study, (Maduabum, 2004). The target population for the study was all College of Distance Education undergraduate first year students (2017/2018-year group) of the University of Cape Coast, Ghana. The population was estimated to be 35000. The sampling of respondents was done using a multistage sampling procedure. Purposive sampling technique was employed to select three administrative regions (thus Greater Accra region, Central region and Western region) from the total of 10 regions. The second stage involved the selection of six "study centers" from the three regions using random sampling procedure. The third stage involved the selection of respondents. At this point, the researcher used proportionate stratified sampling technique to select respondents from the six "study centers". In this case the researcher used a common ratio of 153: 707 or (.216) to get a sample from each of the selected centers. The samples from all the six centers were put together to form a single case to make a total sample size of 306. The instrument that was used for data collection was a self-developed questionnaire formed based on the theories of Self-regulated learning (SRL) and Collaborative learning (CL). The questionnaire was made up of five sections named A, B, C, D and E. The first subsection (thus section A) of the questionnaire had five items that covered background information of the respondents. Background information included in the items were age-range, gender, marital status, programme of study and whether or not the respondent was a student worker. Section B of the questionnaire was about respondents' attitude toward online learning. This subsection was made up of ten (10) items. The Cronbach Alpha index of this subsection is .84. Section C of the questionnaire was about respondents' self-regulated learning skills. This subsection was made up of ten (10) items with each of them being positively worded. The Cronbach Alpha index of this subscale is .79. Section D of the instrument explored respondents' collaborative and interactive learning behaviour of students. It was made up of nine (9) close ended items and an open-ended item with all the items being positively worded. The Cronbach Alpha for this subscale is .76. Section E of the questionnaire also elicited information about respondents' skills acquired in ICT, relevant for online learning. This subscale was also made up of five (5) items and an open-ended item. The Cronbach Alpha index of this part of the questionnaire is .62. All the items on this subscale are positively worded. In all, 41 items are on the questionnaire, with all the items being close ended with spaces for open ended responses. All the subsections were on a five-point Likert type of scale ranging from "Strongly Agree (SA)" to "Strongly Disagree (SD)". The Cronbach Alpha index for the entire questionnaire was .81. To explain the reliability of a constructed questionnaire better, it is important to report the subscales Cronbach Alpha coefficient together with the entire scale Cronbach Alpha Reliability Coefficient (Quansah, 2017). A pilot test was conducted to refine and fine-tune the instrument (Amedahe, 2002). The reliability coefficient of the instrument was .81. The questionnaires were administered to respondents by the researcher and a research assistant after permission had been sought from the relevant authorities of the various study centers. The data to answer the research question was analyzed using descriptive statistics specifically, mean and standard deviation as well as inferential statistics, thus standard linear multiple regression. All ethical protocols surrounding the conduct of a scientific study which includes confidentiality and anonymity were adhered to during and after the conduct of the study.

Data collection procedure

The questionnaire was administered to the respondents by the researcher and five research assistants. The researcher designated two days to train the five research assistants in line with the purpose of the study and how respondents are to be handled. Before the data collection exercise, the researcher sought permission from the Regional Resident Tutors (RRT's) and Center Coordinators of the three selected regions and centers for their permission and cooperation. This was done by making copies of introductory letter from the academic department of the researcher that specifies the intent of the researcher for selecting those centers and regions. In each of the centers, the researchers explained the purpose of the study to the respondents (first year Distance students) and assured them of confidentiality and anonymity for their participation in the study. Questionnaires were then administered to the respondents by the researcher and the research assistant at the various centers selected for the study. There was time for questions, during which respondents had the opportunity of asking questions that were not clear to them before responding to the questionnaire. This aspect is crucial because it helped to erase respondents' biases and prejudices (Trochim, 2000). Moreover, it also helped to ensure good contact with the respondents to further explain the purpose

of the study so that the researchers will win the commitment of the respondents toward responding to items on the questionnaire and submitting them in good time. In all, 306 students were given the questionnaire to respond to. However, after the data collection, 259 respondents submitted completely filled questionnaires. This represent 85% response rate. The data collected in this study was checked, edited, coded and statistically analyzed with both descriptive and inferential statistics based on the research questions and the literature reviewed for the study.

RESULTS

The results of the main data were presented according to the research questions asked. For the purposes of analysis and discussions, the average mean score for all the responses is 3.0. Hence, mean score of 3.0 and above suggest respondents' agreement, whereas mean score below 3.0 suggest respondents' disagreement.

What is students' attitude toward online learning in Ghana?

This research question sought to find out the attitude that distance education students in University of Cape Coast have towards online learning. Data was collected using a questionnaire and summary of the analysis is presented in the table below. From the table, responses indicate that respondents agreed (M= 3.5, SD= 1.2) to the statement "I would be able to understand course related information when it is presented in video formats". The standard deviation score also suggests that respondents' responses on that item were heterogeneous. This was followed by respondents believe (M= 3.3, SD= 1.3) that, it is time for the College to implement an online learning platform. Moreover, when it comes to the statement "I think online-learning mode provides the flexibility to study at the time convenient to the learner," respondents agreed (M= 3.3, SD= 1.4). This statement shows that distance education students believe that online learning would provide with easy and comfortable time to learn on their own. To climax it all, respondents agreed (M= 3.2, SD= 1.5) that I think there is that possibility for live lectures over the internet, as is done in the classroom. In this case, respondents have good perception about online mode of instruction.

Overall, the mean of means (M= 3.1, SD= 1.3) score shows that respondents have a positive attitude toward online learning at the distance mode of education in Ghana. In other words, distance education students of the University of Cape Coast, Ghana, would rather choose to have their mode of tuition online rather than onsite. This is because they believe that they would be able to understand course related information when it is presented in video formats. Again, they have the perception that online-learning mode is flexible, and students are able to learn at the time that is convenient to them.

Table 1- *Attitude towards online learning among distance education students in the University of Cape Coast.*

Statements	M	SD
I would be able to understand course related information when it is presented in video formats.	3.5	1.2
I would be able to make note for myself while watching the video of my instructor on the computer just as is done in a face to face setting	3.3	1.3
I think online-learning mode provides the flexibility to study at the time convenient to the learner.	3.3	1.4
In my opinion, it is time for the College to implement an online learning platform	3.3	1.4
Staying at home and having live lectures over the internet on weekends would be very challenging.	3.2	1.4
I think there is that possibility for live lectures over the internet, as is done in the classroom.	3.2	1.5
I believe learning is the same for both classroom face to face lecture and online lecture.	2.9	1.4
I feel that learning on the internet outside of class will be more motivating than face to face course.	2.7	1.3
I don't foresee any usefulness of online-learning in our country.	2.6	1.4
Mean of Means	**3.1**	**1.3**

Source: Field survey, (2018).

What is the self- regulated learning skills of distance education students of University of Cape Coast?

The research question sought to investigate the self-regulated learning skills of distance education students of University of Cape Coast. Data was collected using a questionnaire and summary of the analysis is presented in Table 2 below. The results show that respondents agreed (M= 4.2, SD= 1.0) that in their studies they set goals and have a high sense of initiative toward achieving their goals. This statement indicates that distance students in the University of Cape Coast set objectives and have a high sense of conviction to accomplish them. This was followed by respondents' agreement (M= 4.1, SD= 1.1) to the statement "when preparing for a test or exams I put together the information from class and from other sources." Moreover, when offered with the statement "I do isolate myself from anything that distracts me when studying on my own" respondents agreed (M= 3.8, SD= 1.2). The respondents also agree (M= 3.7, SD= 1.1) with the idea that when it comes to academic work, they evaluate their goals periodically, they can also organize their studies and change their plans when the need arises. In this case, when it comes to academic work, they are self-directed. Finally, when presented with the statement "I am able to adhere to study time effectively and easily complete assignment on time", respondents agreed (M= 3.6, SD= 1.1).

On a whole, the mean of means (M= 3.6, SD= 1.2) score suggests that distance students in the University of Cape Coast possess good self-regulated learning skills. Findings have shown that respondents use self-regulated learning skills such as; setting goals and have high sense of initiative toward achieving the goals, putting together information from different sources when preparing for a test or exam, isolating oneself from anything that distracts studying attention. Respondents also indicated that when it comes to academic work, they evaluate their goals periodically. Finally, respondents pointed out that they are able to adhere to study time effectively and easily complete assignment on time. The good self-regulated learning skills is more likely to aid effective learning among students should online learning mode be instituted.

Table 2- *Self-Regulated Learning Skills of University of Cape Coast distance education   students.*

Statements	M	SD
In my studies I set goals and have a high sense of initiative toward achieving my goals.	4.2	1.0
When preparing for a test or exams I put together the information from class and from other sources.	4.1	1.1
I do isolate myself from anything that distracts me when studying on my own.	3.8	1.2
When it comes to academic work, I evaluate my goals periodically.	3.7	1.1
I can organize my studies and change my plans when the need arises.	3.7	1.1
When it comes to academic work, I am a self-directed person	3.7	1.1
I am able to adhere to study time effectively and easily complete assignment on time.	3.6	1.1
I would be able to stay focus on my academic work even when there is distraction in my home. (e.g. television, children and such)	3.0	1.4
I would be able to stay focus on my academic work even when there is distraction in my home. (e.g. television, children and such)	2.9	1.4
I would be able to remain motivated even though the instructor is always not online.	2.8	1.3
Mean of Means	**3.6**	**1.2**

Source: Field survey, (2018).

What is the collaborative and interactive skills of distance education students of University of Cape Coast?

The research question sought to find out the collaborative and interactive skills of distance education students of University of Cape Coast relevant for online education. Data were collected using a questionnaire and summary of the analysis is presented in Table 3. From the table, responses indicate that respondents agreed (M= 4.0, SD= 1.0) to the statement "I like to study in groups". The statement indicates that distance students in the College of Distance Education in the University of Cape Coast mostly prefer to study in groups. This was followed by respondents'

agreement (M= 3.8, SD= 1.2) that they would be able to express themselves clearly when writing to others online if the need arises. Moreover, when it comes to the statement "I am willing to share my ideas and thoughts in an online group studies" respondents agreed (M= 3.7, SD= 1.2). This statement shows that distance education students in the University of Cape Coast can discuss or share their ideas and thought when it comes to online group studies. Furthermore, respondents agreed (M= 3.6, SD= 1.2) that they can utilize other student's knowledge that they receive online for their own learning. In addition, respondents agreed (M= 3.6, SD= 1.3) that they would be able to ask questions and make comments when studying with others online. Again, respondents agreed (M= 3.5, SD= 1.2) that they know how to give constructive feedback when interacting with others online. Respondents agreed (M= 3.4. SD= 1.3) that they can work in a group in an online study, better still they agreed (M=3.3, SD= 1.4) that do not find it difficult to express their opinion to others through video conferencing example skype. Finally, respondents agreed (M=3.1, SD= 1.3) that they would be able to follow along with an online conversation while typing.

Conclusively, the mean of means (M= 3.6, SD= 1.2) score revealed that respondents who are distance students of the University of Cape Coast agreed that they possess adequate collaborative and interactive skills. This is shown in the respondents' agreements to all the items presented in Table 3.

Table 3- *Collaborative and interactive skills of distance students' in the University of Cape Coast.*

Statements	M	SD
I like to study in groups	4.0	1.0
I would be able to express myself clearly through my writing to others if the need arises.	3.8	1.2
I'm willing to share my ideas and thoughts in an online group studies.	3.7	1.2
I can utilize other student's knowledge that I receive online for my own learning.	3.6	1.2
I would be able to ask questions and make comments when studying with others online	3.6	1.3
I know how to give constructive feedback when interacting with others online.	3.5	1.2
I can work in a group in online studies.	3.4	1.3
I do not find it difficult to express my opinion to others through video conferencing e.g. skype	3.3	1.4
I would be able to follow along with an online conversation while typing.	3.1	1.3
Mean of Means	**3.6**	**1.2**

Source: Field survey, (2018)

What are the ICT skills acquired by students for online learning?
This research question sought to ascertain the skills acquired in ICT for online leaning by distance education students in University of Cape Coast. Data were collected using a questionnaire and summary of the analysis is presented in Table 4. Results from the table shows that respondents agreed (M= 3.9, SD= 1.3) that they have the skill to communicate effectively with others using online technologies such as email, chat, facebook, whatsapp etc. The respondents also followed up with the idea that they have the basic skills for finding their way around the internet (eg using search engine; google etc) as well as the basic skills to operate a computer (e.g., saving files, creating folders). This was indicated by the mean score of (M=3.7, SD= 1.3). Again, when presented with the statement, "I think that my background knowledge and experience with ICT will be beneficial for online learning model.' Respondents agreed (M= 3.6, SD= 1.2). This statement suggests that indeed distance students in the University of Cape Coast who served as respondents have a firm belief that their basic ideas and skills in ICT will adequately assist them in learning if they are to enroll on online mode of tuition.

All in all, gauging from the mean of means of Table 5, which is (M= 3.7, SD= 1.3), shows that respondents have acquired the basic skills in ICT for online learning. In other words, respondents have information communication and technology skills relevant to be successful learners of online distance education programme.

Table 4- *Skills acquired in ICT for online learning by distance education students   in the University of Cape Coast.*

Statements	M	SD
I have the skill to communicate effectively with others using online technologies (email, chat; facebook, whatsapp etc.)	3.9	1.3
I have the basic skills for finding my way around the internet (e.g., using search engine; google etc.).	3.7	1.3
I have the basic skills to operate a computer (e.g., saving files, creating folders).	3.7	1.3
I think that my background knowledge and experience with ICT will be beneficial for online learning model.	3.6	1.2
I can send an email with a file attached to others.	3.5	1.3
Mean of Means	**3.7**	**1.3**

Source: Field survey, (2018)

Which factor(s) predict more of students' readiness toward online learning in Ghana?
This research question sought to investigate factor(s) that predict more of students' readiness toward online learning. The data were collected using a questionnaire and the analysis was done using standard linear regression.

Table 5- *Predictors of students online learning readiness*

Model	Unstandardized Coefficient		Standardized Coefficient		
	B	Std Error	Beta	t	Sig.
1 (Constant)	5.813	1.003		5.794	.000
attitude	.214	.111	.127	1.932	.054
Self-reg.L	.349	.110	.196	3.174	.002
ICTskills.	.350	.070	.331	5.022	.000
Collab.skils	.124	.073	.102	1.699	.090

Dependent variable: online leaning readiness.

The standard linear multiple regression test was conducted after three major assumptions have being tested. First, the data was tested for normality assumption. In this test, the residual normal probability plot of the model output was inspected. The points in the normal probability plot lied straight diagonal from bottom left to top right. This actually suggests no major violation of the normality assumption.

Histogram

Normal Q-Q Plot of Attitudescale
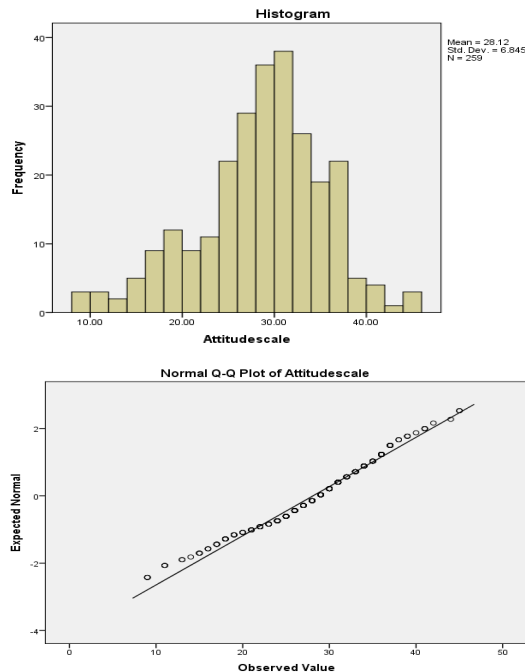
The second assumption test was multicollinearity. To check for multicollinearity assumption, "variance inflation factor (VIF)" was inspected, fortunately, the VIF value was 2.245 which is less than the cut-off value of 10, suggesting no violation of the multicollinearity assumption. Finally, visual examination of the plots of the standardized residuals by the regression standardized predicted value suggest that "homoscedasticity" assumption has also not been violated. The purpose of this test was to check for the overall contribution of the model (dimensions of the questionnaire, thus students' attitude, self-regulated behavior, collaborative skills and ICT skills) to explaining the dependent variable (students' readiness for online learning). In this line, (R^2 =.378). The R square value explains 37.8% of the variance in respondents' readiness for online learning. The value of 37.8% suggests that indeed the model predict higher respondents' readiness for online learning. To further investigate the model, further analysis was done to check for the individual contributions of all the dimensions of the students' online readiness questionnaire (thus students' attitude, self-regulated behavior, collaborative skills and ICT skills). Results from Table 5 indicate that ICT skills dimension of the scale makes the strongest (β= .331, t= 5.022, p= .0005) unique contribution to explaining students' readiness for online learning, when variance explained by all other variables in the model is controlled for. This is followed by students self-regulated dimension of the scale (β= .196, t= 3.174, p= .002) which contribute significantly to explaining students' readiness for online learning. However, in the model, attitude (β= .127, t= 1.932, p= .054) and Collaborative skills (β= .102, t= 1.699, p= .090) seem not to be significant in terms of variance accounted for in the dependent variable (readiness for online learning). In summary, field data, suggest that students' skills acquired from pre-tertiary institutions and their ability to self-regulate their own learning are important ingredients that could sustain an online learning model. In the case of "student attitude" and "collaborative learning" dimensions, they are important for online learning model however, they do not significantly contribute to the sustainability of such a model.

DISCUSSIONS
Research question one sought to investigate distance education students of University of Cape Coast (UCC) attitude toward online learning. From the data analysis, results revealed that respondents have positive attitude toward online learning at the distance mode of education in Ghana. This was due to the fact that, they felt online mode of teaching and learning is quite flexible as compared to the traditional face to face onsite mode of teaching and learning. The findings of this study corroborate with Fageeh (2011) who examined the attitude and perception of undergraduate students regarding their readiness to accept online learning at King Khalid University. He discovered that students have positive attitude toward the online learning. The study also showed that students are ready to accept technology implementation and so shift to an e-learning model of education. In a like manner, Alanazy (2018) also discovered in a survey that a chunk majority of respondent have positive attitude toward online learning. This presupposes that many students believe that currently, the way to go in distance education is "online mode" and not the traditional onsite type.

This second research question sought to explore student self-regulated learning skills that shows that they are indeed ready for online learning. Respondent indicated through their responses that they have good self-regulated learning skills. For purposes of emphasis, findings showed that respondents use self-regulated learning skills such as; setting goals and have high sense of initiative toward achieving the goals, putting together information from different sources when preparing for a test or exam, isolating oneself from anything that distracts studying attention. Moreover, respondents indicated that they are able to adhere to study time effectively and easily complete assignment on time. This self-regulated learning behavior is more likely to serve as a scaffold to aid better performance in an online study. The findings of this study is in line with Quince (2013) who examined the effect of self-regulated learning strategy interventions on students' self-regulated learning conduct and academic success in community-college online courses. The study discovered that self-regulated learning strategy intervention was successful in increasing the metacognitive awareness. In this case, increased metacognitive awareness positively contributed to students' efficacy for academic success in online courses.

To answer whether students have the capabilities to collaborate and interact in an online learning environment in Ghana was the objective of this question. Findings revealed that respondents who are distance students of the University of Cape Coast possess adequate collaborative and interactive skills. In this section of the research instrument, respondents find no difficulty in forming groups. They are also willing to share ideas with others online and further indicated that they have the ability to ask questions in an online interaction with others as well as to give constructive feedback. In the manner as indicated by respondents, there are enough evidence to suspect that students are more likely to do better in an online mode of education. Again, it is more likely that the only time that learners' online collaboration and interaction can jeopardize their learning is when time to meet is scarce or when any of the members of a group or all do not easy access to internet or even computer etc. This idea is actually in line with the study of Koo (2008) who explored collaborative behaviours of students toward online learning. He found out that time constraint and insufficient access to technology such as computer and internet were confirmed to be the two impediments to online collaborative learning. This finding has implication for policy direction for institutions that are ripped for online learning mode.

The fourth research question was on student basic skill level in ICT relevant for online learning. This research question sought to explore ICT competency among respondents who were UCC distance education students. Findings show that respondents have information communication and technology skills relevant to be successful learners of online distance education programme. For purposes of emphasis, respondents indicated that they are competent users of email, chat, facebook, WhatsApp among a host of others. Further, they also showed in their responses competency of operating a computer especially, in areas such as creating files, saving file documents, sending document either in word or portable document format (PDF). The finding is in agreement with Tagoe and Abakah (2014) investigated University of Ghana distance education students' perception and readiness toward mobile learning. Findings from the study showed that most of the students had mobile phones and used them for conversation and texting. Tagoe and Abakah finding further showed that young students were more likely to have the competency in operating smart phones and other gadget than their older colleagues. Fortunately, this current study result showed that most of the distance education students are young men and women below the age of 40 years. The implication is that, there is more likelihood that they would be able to operate technological gadget and hence make online distance education encounter fruitful.

Research question five sought to investigate factor(s) that predict more of students' readiness toward online learning. Findings from the study showed that students' skills in ICT acquired from pre-tertiary institutions and their ability to self-regulate their own learning are important factors that could sustain an online learning model. The finding is in support of Ansong (2015) explored the technological, institutional and environmental determinants of online learning adoption in the University of Ghana using a multi-stakeholder approach. On the technological dimension, the study found information technology infrastructure and perceived ease of use of ICT as important factors in the literature. Moreover, Ngamau (2013) who investigated individual, organisational and technological factors that contribute to limited success in the rolling out of online learning programmes at Jomo Kenyatta University found ease of use of the ICT system and ICT infrastructure. In this case earlier studies have all pointed to the ease of use of ICT, that is to say that students who are the focal point of instruction must have competence or skills of ICT usage to sustain online learning model. With respect to students self-regulated learning behavior which is the second factor identified in this present study, previous studies (Quince, 2013; Venter, 2011) have already on it relevance.

CONCLUSION
Based on the findings of the study, it can be concluded that respondents have the believe that conditions are ripped for universities in Ghana, especially, University of Cape Coast to focus on online distance education model since

students' perception and attitude toward online learning are positive. Moreover, it is worth concluding that on-site distance education students have the skill when it comes to setting goals and have high sense of initiative toward achieving the goals, putting together information from different online sources when preparing for a test or exam, isolating themselves from anything that distracts studying attention as well as able to adhere to study time effectively and easily complete assignment on time. In this case they are good self-regulated learners. This self-regulated learning behaviour of students have implication for rolling up online courses that match-up with the job market needs of today. Furthermore, it can be concluded that onsite students have the competency in interacting with others online in the form of sharing knowledge, creating groups, asking questions about academic course content materials, providing constructive feedback to friends among a host of others. The implication is that onsite distance education students of UCC could collaborate and interact effectively when switched to online learning mode.

The study is descriptive in nature. It is essentially, an initial step to investigate students' readiness for an online learning at the distance education mode in Ghana. With regards to its limitation, a study, of this nature should have included all the students at the study centres; however, for economy of time, first year students of four study centers were sampled to be used for the study. This might affect the generalizability of the study to some extent. Even though the study made use of an adapted questionnaire of high reliability for the data collection, however, one cannot be very certain as to whether responses of the respondents under study are true or false. One cannot judge the honesty and truthfulness of such responses made by the respondents and this might affect the reliability of the study. Future research should explore; University of Cape Coast distance education tutors' readiness for online distance Education.; Individual, organizational and technological factors that contribute to limited success in the rolling out of online learning programmes; Strategies for online instructors to promote students use of self-regulated learning strategies (SRLS) in online courses. Researchers also recommend that management of the University of Cape Coast, College of Distance Education (CoDE) should direct their focus to the formulation of appropriate and operational online learning policies to guide the college towards successful implementation of this mode of learning since the target audience (students) have positive attitude toward online learning platform.

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Appendix

Confirmatory Factor Analysis for the Questionnaire

Construct	Items	Factor Load	Composite Reliability	Average Variance Extracted
Attitude toward online learning	Q1	.825	.720	.505
	Q2	.781		
	Q3	.742		
	Q4	.728		
	Q5	.703		
	Q6	.698		
	Q7	.656		
	Q8	.635		
	Q9	.599		
Self-regulated learning skills			.854	.465
	Q10	.806		
	Q11	.739		
	Q12	.734		
	Q13	.728		
	Q14	.718		
	Q15	.704		
	Q16	.645		
	Q17	.613		
	Q18	.589		
	Q19	.490		
Collaborative and Interactive Skills			.900	.249
	Q20	.635		
	Q21	.592		
	Q22	.546		
	Q23	.543		
	Q24	.525		
	Q25	.467		
	Q26	.461		
	Q27	.316		
	Q28	.307		
Skills acquired in ICT			.904	.129
	Q29	.429		
	Q30	.402		
	Q31	.324		
	Q32	.321		
	Q33	.301		

*Q1-Q33 signifies the items on the questionnaire

Table 6- *KMO and Bartlett's Tests*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.920
Bartlett's Test of Sphericity	
Approx. Chi-Square	4434.359
Df	528
Sig.	.000

The 33 items of the student readiness for online questionnaire were subjected to principal component analysis (PCA) using SPSS version 22. Prior to performing PCA the suitability of data for factor analysis was assessed. Inspection of correlation matrix revealed the presence of many coefficient of .3 and above. The Kaiser-Meyer-Oklin value was .92, exceeding the recommended value of .6 (Kaiser, 1970). Moreover, the Bartlett's test of sphericity also reached statistical significance (see Table 6), supporting the factorability of the correlation matrix.

To aid in the interpretation of these four components, Oblimin rotation was performed. The rotated solution revealed the presence of simple structure with all the component showing a number of strong loadings and variables loading substantially on the respective component. The result of this analysis supports the use of the questionnaire in measuring the various construct as shown in the analysis of the main data of the various research questions.

PREDICTING EASE OF STUDYING AND LEARNING SUCCESS FROM LEARNER CHARACTERISTICS IN A DISTANCE TRAINING FOR IN-SERVICE TEACHERS

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ABSTRACT
How to support students in successful learning is one of the persisting problems of distance and online learning. One research focus that can inform educators is to explore the extent that learners' characteristics and skills determine learning. Thus, this study explores the effects of domain-specific prior-knowledge, intrinsic motivation, computer attitude, computer anxiety, and learning management skills on learning in a training course about media pedagogy for teachers. The data were collected from 49 in-service teachers who answered various questionnaires and took knowledge tests. By using regression analyses, we investigated the extent that the selected learner characteristics account for ratings of content difficulty, studying difficulty, experienced pressure/tension, and effort/importance while learning and for performance. Content difficulty was best predicted by computer anxiety and studying difficulty by computer anxiety and intrinsic motivation. The experienced pressure/tension was best predicted by intrinsic motivation and time management skills. Effort/importance was best predicted by meta-cognitive skills and performance by meta-cognitive skills and prior knowledge.
Keywords: Distance training, teacher training, higher education, self-regulated learning, computer attitude, computer anxiety, Cognitive Load Theory.

INTRODUCTION

Distance learning methods are well established in the areas of continuing and higher education (e.g., Allen & Seaman, 2016). Although 30 years of ample empirical studies have provided sound theoretical and practical knowledge, we still need more insights on how to foster successful student learning (Jo, Park, Yoon, & Sang, 2016). One empirical approach is to explore the extent that learners' characteristics and skills determine learning outcomes and to use critical characteristics as starting points for interventions. The following study explores the predictive power of in-service teachers' motivational, affective, cognitive, and skill aspects on cognitive load and performance against the background of the Cognitive Load Theory (Paas & Sweller, 2014) by using a script-based distance training about media pedagogy. Based on the empirical literature, the authors had focused on domain-specific prior knowledge, intrinsic motivation, computer attitude, computer anxiety, and learning strategies.

COGNITIVE LOAD THEORY

The Cognitive Load Theory sets working memory in the center of learning and problem solving (Paas & Sweller, 2014). Particularly, the capacity of working memory and its processing limits (e.g., in time) are emphasized and how the capacity is occupied by cognitive processes (Paas & Sweller, 2014). The load imposed on working memory by information being processed is then called cognitive load (Paas & Sweller, 2014). A distinction is made between intrinsic, germane, and extraneous load. Intrinsic load has often been described as the basic amount of processing required for understanding the presented information (Sweller, 2010). Intrinsic load relates to the number of relevant information elements to be learned and their interactivity. Interactivity is reflected in the concurrent processing of information elements in working memory that must be performed to understand the subject matter. A higher level of elemental interactivity is usually associated with the learning content being rated as more difficult and, in consequence, also with studying being rated as more difficult. Germane load builds upon intrinsic load and relates to creating schemas from relevant information elements and storing them in long-term memory (Sweller, 2010). Extraneous load relates to the processing of irrelevant information elements in working memory, which can impede knowledge acquisition. The presentation manner

of the material resulting from inappropriate instructional designs are considered a main source of extraneous load (Paas & Sweller, 2014; Sweller, 2010). Learning is often difficult because of working memory limitations. A cognitive overload of working memory capacity mostly occurs when intrinsic load or extraneous load is high. Successful learning occurs when working memory capacity is not overburdened by overall cognitive load and when as much capacity as is available can be allocated to germane load.

STUDENT CHARACTERISTICS
Domain-specific prior knowledge
Simonsmeier et al. (2018) showed in their current meta-analysis that prior knowledge has a medium to strong causal effect on knowledge after learning. They reported that the correlation between domain-specific prior knowledge and knowledge at posttest was high overall with r > .50. They also investigated knowledge gains over time – with less statistical power due to the number of studies – and found a significant compensatory effect (negative correlation) for instructions with low cognitive demands and a non-significant but descriptively observable Matthew effect (positive correlation) for instructions with high cognitive demands. The compensatory effect is suggestive of the expertise reversal effect described and empirically investigated against the background of Cognitive Load Theory. The expertise reversal effect refers to "the reversal in the effectiveness of instructional formats or procedures as levels of learner expertise in a domain change when relatively more guided instruction is beneficial for novices, but is disadvantageous for more expert learners" (Kalyuga, 2014, p. 593). Expertise reversal effects were found in a variety of instructional designs that were less complex with relatively short learning situations (Kalyuga, 2014). Expertise reversal effects are not strongly expected to occur in distance-training courses, which typically allow self-paced and self-sequenced learning with varying degrees of freedom and thus allowing experienced learners to regulate their learning more adequately (Kalyuga, 2014). In correspondence with the meta-analyses of Simonsmeier et al. (2018), research on complex learning environments that included distance learning scenarios has also mainly focused on overall correlations between prior knowledge and post-learning test performance. These studies have found a positive impact on a variety of performance measures (e.g. Amadieu, Tricot, & Mariné, 2009; McDonald & Stevenson, 1998; Stiller & Bachmaier, 2018; Stiller, 2003, 2009, 2019). However, the results included no statements about the existence of expertise reversal effects.

In reference to the Cognitive Load Theory, prior knowledge should influence the experienced intrinsic and overall cognitive load while learning. As prior knowledge reduces the complexity of the content, a higher level of prior knowledge should be related to a lower level of intrinsic load and vice versa. It might be suggested that typically, a lower level of intrinsic load is related to a lower level of germane load because the number of new information elements and their interactivity is less for advanced learners. Consequently, advanced learners might experience a lower level of overall working memory load. Studies reporting corresponding results are sparse and inconsistent. For example, Stiller and Köster (2017) found weak evidence for the assumed relationship between prior knowledge and intrinsic and various overall load measures (reported in the supplementary file), whereas Stiller and Bachmaier (2018) reported no evidence for the relationship.

Intrinsic motivation
Overall, motivational factors of students are assumed to explain and predict successful learning in general and distance/online learning in particular (Jones & Issroff, 2007; Stiller & Bachmaier, 2018). One focus of research has been on intrinsic motivation, which refers to performing an activity that is inherently enjoyable or interesting, and its relation to high-quality learning (Ryan & Deci, 2000; Schunk, Pintrich, & Meece, 2008). Overall, positive correlations between intrinsic motivation and performance/achievement is evidence for this supposed relation (Ali & Franklin, 2001; Aragon, Johnson, & Shaik, 2001; Artino, 2008; Delialioglu, 2005; Fredericksen, Pickett, Shea, Pelz, & Swan, 2000; Cerasoli, Nicklin, & Ford, 2014; Orhan Özen, 2017; Richardson, Abraham, & Bond, 2012; Sankaran & Bui, 2001; Stiller & Bachmaier, 2018; Waschull, 2005; Yukselturk & Bulut, 2007). Meta-analyses reviews have revealed intrinsic motivation as a medium to strong predictor of performance and achievement (Cerasoli et al., 2014; Orhan Özen, 2017; Richardson et al., 2012; Schneider & Preckel, 2017). Students who are more intrinsically motivated might put more effort into learning and especially processing information more deeply, which is assumed to lead to higher performance and achievement.

According to the Cognitive Load Theory, (intrinsic) motivation is assumed to influence how students prepare for learning, the levels of intrinsic, germane and extraneous load they will experience, and how they regulate cognitive loads while learning (Ismail, Kuldas, & Hamzah, 2013; Moreno & Mayer, 2007; Schnotz et al., 2009; Stiller & Bachmaier, 2018; van Merriënboer & Ayres, 2005; Vollmeyer & Rheinberg, 2006). (Intrinsic) motivation could affect all types of load during learning (Schnotz et al., 2009; Ismail et al., 2013; Stiller & Bachmaier, 2018). Intrinsic motivation may even be more important for regulating load when it is high. The

Cognitive Load Theory perspective mainly relates a higher level of intrinsic motivation to a higher level of germane load (which could be interpreted as high-quality learning). In a distance-training context, Stiller and Bachmaier (2018) found evidence for these assumptions. Small positive relations were revealed between intrinsic motivation and learning skills (i.e., the usage of meta-cognitive learning strategies and strategies for arranging an adequate learning environment), invested effort, and performance.

Learning strategies
A successful distance/online student is assumed to be a good self-regulated student (Barnard, Lan, To, Paton, & Lai, 2009) who adequately uses cognitive learning strategies, metacognitive learning strategies, and resource management strategies (Pintrich, 1999). For distance learning, metacognitive strategies for planning, monitoring and regulation of cognitive processes and resource management strategies for managing and controlling the study environment are considered to be among the most important strategies (Lee, Choi, & Kim, 2013). In particular, time management strategies and strategies for arranging the study environment are focused among resource management strategies. From a Cognitive Load Theory perspective, a higher level of strategic abilities of students might affect cognitive load while learning. For example, when students study without disturbances and distractions and focus cognitive resources on information processing more efficiently, extraneous load should decrease, and germane load should increase. Higher strategical student abilities might avoid overload, which in turn should result in more successful learning and consequently test performance. In contrast, lower levels of strategic abilities might lead to less learning success. In addition, Stiller and Bachmaier (2018) proposed that having sufficient time to process the content might result in experiencing lower levels of intrinsic load (i.e., managing the same amount of element interactivities in shorter periods might also increase the task difficulty). In distance learning, the empirical evidence corresponds to this rationale. Management skills have been found to be significant predictors of learning achievement (e.g., Yukselturk & Bulut, 2007) and dropout (e.g., Hart, 2012; Lee & Choi, 2011). Stiller and Bachmaier (2018) showed a predicting power of strategy usage on ratings of content difficulty (intrinsic load) and invested effort but not performance. The latter result could be explained by task difficulty and study time. Even students with lower levels of strategic abilities might have been able to master the learning task because it was relatively easy (they were only required to acquire factual knowledge), and they could spend as much time as they needed. In other words, a simple spend-more-time-on-studying strategy would have been a successful strategy for distance students (i.e., trainee teachers).

Computer attitude
Blignaut, Burger, McDonald and Tolmie (2005) defined computer attitude as "a complex mental state that affects a human's choice of action or behavior toward computers and computer-related tasks" (p. 500). Computer attitude includes affective, conative, and cognitive components (Richter, Naumann, & Horz, 2010). Attitudes are often defined as beliefs that are organized in topics (Tourangeau, 1992; Tourangau, Rasinski, & D'Andrade, 1991), which reflects a cognitive perspective. Richter, Naumann and Groeben (2000; cf. Richter et al., 2010), for example, focused on the topic "computers as an object of personal experience" and furthermore on the subtopic "computers as a self-experienced instrument for working and learning." In addition, attitudes are assumed to reflect a bipolar structure. Thus, a person might concurrently hold negative and positive beliefs about computers (Pratkanis, 1989). Richter et al. (2000, 2010) termed their positive attitude component as a "beneficial tool" dimension and the negative component as an "autonomous entity" dimension of computer use. For example, students might concurrently believe that computers are helpful tools that make learning and working easier and also that computers are uncontrollable and mysterious machines. Only a few studies have investigated the effects of computer attitude on distance and online learning, particularly assessing course usage, dropout and performance. Negative attitudes affected course usage, persistence, and performance negatively (e.g., Stiller, 2009, 2019), whereas positive attitudes (including attitudes toward e-learning, internet use, information technology, or technology use) had positive effects (e.g., Bernard et al., 2004; Sam, Othman, & Nordin, 2005; Stiller & Köster, 2016).

From a Cognitive Load Theory perspective, attitude towards computers is a feature of a student that might affect working memory load while learning. Discussing attitude towards computers for learning must address the positive and the negative attitude components. Having a high level of the positive attitude component (e.g., as a beneficial tool; Richter et al., 2010) might advantageously work like intrinsic motivation by stimulating students to put more effort into learning and especially into processing information more deeply, which is assumed to lead to higher performance and achievement. Believing to use a helpful tool for learning and working might be a (powerful) motivator for practicing learning and working. Low levels of beneficial-tool beliefs are less likely to induce effort. Conversely, the presence of a negative attitude component might create extraneous load that stems from processing disturbing thoughts about the functioning of the computer in use (e.g., the computer malfunctioning or even crashing). Cognitive processes that do not contribute to schema acquisition and automation are per definition extraneous load. Learners without a negative attitude component should have

fewer disturbing thoughts and thus a lower level of extra working-memory load. Correspondingly, they should be able to use the memory resources more adequately for intrinsic and germane processing load.

Computer anxiety

Blignaut et al. (2005) defined computer anxiety as "a diffuse, unpleasant, and vague sense of discomfort and apprehension when confronted by computer technology or people who talk about computers" (p. 500). They added that computer anxiety comprises "an array of emotional reactions, including fear, apprehension, uneasiness, and distrust of computer technology in general" (p. 495). Correspondingly, Igbaria and Parasuraman (1989) earlier described computer anxiety as "the tendency of an individual to be uneasy, apprehensive, or fearful about the current or future use of computers in general" (p. 375). Most studies about distance learning have investigated the influence of computer anxiety on learning, based on the assumption that anxiety directly influences self-efficacy, which influences computer usage and performance (Desai, 2001; Hauser, Paul, & Bradley, 2012; Saadé & Kira, 2009; Sam et al., 2005). These studies have found that computer anxiety is related to higher dropout (Stiller & Köster, 2016, but also see Long et al., 2009; Stiller & Bachmaier, 2017, 2018), lower levels of perceived ease of use of learning environments (Abdullah & Ward, 2016; Baki, Birgoren, & Aktepe, 2018), and lower performance levels (Desai, 2001; Hauser et al., 2012; Saadé & Kira, 2009; Sam et al., 2005; Stiller & Bachmaier, 2018).

Blignaut et al. (2005) summarized that computer anxiety was often conceptualized in the early research on computer anxiety as a component of attitude and that the concepts of computer anxiety and negative attitude toward computers were used interchangeably. As stated above, for example, Richter et al. (2010) distinguished between positive and negative computer attitudes that co-exist concurrently. Furthermore, they also separated computer anxiety from computer attitudes in their Computer Literacy Inventory (Richter et al., 2010). Blignaut et al. (2005) also stated that computer anxiety might not be solely responsible for a negative attitude and that a positive computer attitude, a negative computer attitude, and computer anxiety may be independent of each other. For example, a negative attitude towards computers might not concurrently mean the presence of computer anxiety. Nevertheless, empirical studies have revealed high correlations between negative attitude and computer anxiety when investigating distance learners. For example, Stiller and Köster (2017) and Stiller and Bachmaier (2018) reported correlations of .57 and .83 between the level of computer anxiety and the level of a negative computer attitude for their sample of employees and trainee teachers.

Richter et al. (2010) considered computer anxiety a trait comprising cognitive and affective components (e.g., worrisome thoughts and feelings of anxiety). From a Cognitive Load Theory perspective, when using a computer for learning, students with a higher level of computer anxiety might experience more disturbing thoughts and emotional reactions that contribute to a higher level of extraneous load. Furthermore, extraneous load should additionally rise when students try to cope with negative thoughts and emotions because coping processes do not contribute to schema acquisition and automation. In contrast, learners with low levels of computer anxiety are less likely to experience an extra extraneous load. Thus, they might adequately construct schemas and automate them. Research about computer anxiety based on Cognitive Load Theory is rare.

RESEARCH QUESTION AND EXPECTATIONS

The research question guiding this study was: To what extent is the experienced cognitive load while studying a distance-training course and learning success explainable by motivational, affective, cognitive, and learning skill characteristics of students? To answer this question, we analyzed the data of in-service teachers who had participated in a continuing education distance-training course on media education by using regression analyses. We investigated whether domain-specific prior knowledge, intrinsic motivation, computer attitude, computer anxiety, and learning strategy usage could be used to model five cognitive load assessments, which are ratings of content difficulty, learning ease, experienced pressure/tension, and effort/importance while learning, and test performance.

Domain-specific prior knowledge. We assumed that the learning material and thus studying is easier for learners having a higher level of domain-specific knowledge because they already know a part of the material to be learned. When studying is easier, learners should also feel less pressure and tension while studying and invest less effort. Thus, the level of prior knowledge is expected to correlate negatively with the experienced difficulty of the learning task (i.e., intrinsic load), the experienced difficulty of learning (i.e., overall cognitive load while studying), the effort put into studying, and the pressure and tension felt while studying but positively with test performance.

Intrinsic motivation. We assumed that learners invest more effort into learning and feel less pressured when they are more intrinsically motivated. This might also correspond to an experience of ease of content and

learning. Thus, the level of motivation is assumed to correlate positively with the effort put into studying but negatively with the experienced difficulty of the learning task (i.e., intrinsic load), the experienced difficulty of learning (i.e., overall cognitive load while studying), and the pressure and tension felt while studying. Consequently, being more motivated might also result in higher test performance.

Learning strategy usage. We assumed that planning and controlling learning, managing study time, and arranging a learning environment adequately reduces extraneous load for learners (e.g., they will be less interrupted by unexpected disturbances and have all necessary working material at hand), and lets them experience learning as easier and less tense. In addition, learners can direct more effort into studying. Thus, the level of strategy usage is expected to correlate negatively with the experienced difficulty of the learning task (i.e., intrinsic load), the experienced difficulty of learning (i.e., overall cognitive load while studying), and the pressure and tension felt while studying but positively with the effort put into studying. Consequently, a higher level of strategy usage might also result in higher test performance.

Computer attitude and computer anxiety. A negative computer attitude and computer anxiety should be accompanied by, for example, task irrelevant thoughts and regulation of negative emotions triggered when using a computer. This load by task irrelevant processes should impair learning. Thus, the level of computer anxiety and a negative computer attitude are assumed to correlate positively with the experienced difficulty of learning (i.e., overall cognitive load while studying), the pressure and tension felt while studying, and the experienced difficulty of the learning task (i.e., intrinsic load) but negatively with the effort put into studying. Consequently, a higher level of computer anxiety and a negative computer attitude might result in worse test performance.

METHOD
Sample
The data for analyses were taken from a subset of 318 in-service teachers who had voluntarily enrolled in a continuing vocational distance-training course on media education in the German Federal State of Bavaria. The course was advertised by flyers at all primary, secondary general, intermediate, and grammar schools in Bavaria. The subset comprised 49 teachers (15.4%) who had studied all eight modules of the training course. Not considered for analysis were the data of 250 teachers who had completed less than eight modules and the data of 19 teachers who had completed all modules but at least one of them very fast. By eliminating these data sets from the analyses, we intended to reduce or control the influence of factors that could be confounded with the number of completed modules and study time. For example, the number of completed modules and study time of modules could be confounded with motivation. Thus, we excluded all learners from analyses who were assumed to have not invested enough time for seriously studying the content. We set the criterion for minimum invested study time per module to 25 min, given an estimated 60–90 min workload per module.

Table 1 shows the descriptive data of the enrolled teachers and the subset. More female than male in-service teachers enrolled in the training and studied all modules of the training. The mean age of all enrolled teachers was about 40 years (n = 317), and the mean age of the subset was slightly less with 37 years. Most enrolled teachers and subset teachers worked in intermediate and grammar schools, followed by primary and secondary general schools.

Table 1: Demographic characteristics of the enrolled teachers and its subset.

	Enrolled teachers	Subset of teachers
N	318	49
M of age in years (SD)	39.61 (9.69)	37.16 (8.57)
Range of age in years	21-70	26-59
Female (%)	179 (56.3%)	36 (73.5%)
Male (%)	139 (43.7%)	13 (26.5%
Primary school	32 (10.1%)	6 (12.2%)
Secondary general school	33 (10.4%)	1 (2.0%)
Intermediate school	130 (40.9%)	24 (49.0%
Grammar school	72 (22.6%)	14 (28.6%)
Other than listed	51 (16.0%)	4 (8.2%)

Description of the distance-training course
The distance-training course was developed using Moodle. After the first course login, the introductory module providing information about content, technical requirements, course organization, and self-management for successful distance learning was displayed. The student teachers could freely decide whether to study the introductory module. The main content of the Moodle course comprised eight modules on media education. The

student teachers could freely decide how many modules to study, the sequence in which to study the chosen modules, and how long to study the modules.

Each module was linearly structured by six screen pages. The first page, named *module profile*, presented the overview of the module content and the teaching objectives. The second page provided a case example featuring a real life problem that was designed to emphasize the relevance of the content and to trigger the students' curiosity. The third page requires the students to take a domain-specific prior-knowledge test without a time limit. The test was designed to activate students' prior knowledge and to give feedback about its level. The fourth page gave access to the obligatory instructional text and optional material for further elaboration (e.g., links to videos, audios, webpages, and literature). The fifth page was the module questionnaire about studying the module. The sixth page forced the students to take the final module test; the test evaluated the students' learning success and provided feedback.

The workload for each module was estimated between 60 and 90 min, totaling 8 to 12 hours of work to complete the training. When learners needed support, they could ask for help by email, chat, or phone. Consulting by chat and phone was offered within office hours announced at least four weeks in advance, and emails were answered within a few hours.

Procedure and measurements

Procedure. The training was provided during a regular German school year. First, interested teachers registered online. After registration, the teachers could login to the Moodle course. The first login directly placed the teachers into the introductory module. This was designed to stimulate a self-preparation for distance learning, but studying the module was not obligatory. Leaving the introductory module directed the teachers to the first online questionnaire, which gathered demographic information and assessed various learner characteristics. After completion of the questionnaire, the teachers could choose the order in which to study any of the eight course modules. Each module gathered data about teachers' prior knowledge (see section "description of the distance-training course"; Module Page 3), how they experienced studying the module (module questionnaire on Module Page 5), and their test performance after studying a module (Module Page 6). A teacher could provide up to eight data sets, depending on the number of completed modules. Tables A to C of the appendix list the items of the measurement scales.

First questionnaire. The questionnaire was composed of scales for assessing (1) the motivation to participate in the training, (2) attitude towards computers, (3) computer anxiety, (4) the use of meta-cognitive learning strategies, (5) the use of time management strategies, and (6) the use of strategies for arranging an adequate learning environment. Participation motivation was assessed with the Interest/Enjoyment scale of the Intrinsic Motivation Inventory (IMI; Ryan et al., 1982). The attitude towards computers was assessed with the scale "Personal experience/learning and working/autonomous entity" of the Questionnaire for the Content-Specific Measurement of Attitudes toward the Computer (QCAAC; Richter et al., 2010). This scale measures the negative attitude component described as the presence of regarding computers being uncontrollable machines based on personal experience with using computers as a means for learning and working. Cognitive and affective components of computer anxiety was assessed with the scale "Confidence in dealing with computers and computer applications" of the QCAAC. Finally, learning competence was operationalized by the use of three exemplary persistent strategies of self-regulated learning. The use of meta-cognitive learning strategies (comprising planning, monitoring, and regulating), time management and learning environment were assessed by the corresponding scales of the Questionnaire for Measuring Learning Strategies of Students (Wild & Schiefele, 1994).

Module questionnaires. Four subjective rating instruments assessed the experienced cognitive load while learning. Two 5-items scales of the IMI were used: The Effort/Importance scale (an indirect measure of cognitive load) and the Pressure/Tension scale (a direct measure). Additionally, two direct measures of intrinsic and overall load were applied: A one-item rating of content difficulty assessed intrinsic load and a one-item rating of difficulty of studying assessed overall load.

Tests of prior knowledge and performance. The training was intended at providing factual knowledge. Hence, multiple choice tests were considered appropriate for assessing corresponding prior knowledge and learning success. Each module provided a prior knowledge test at the beginning and a performance test at the end of a module. Each prior knowledge test comprised five multiple-choice items, and each performance test 15 items. The five items of the prior knowledge test were also included in the performance test. Each item provided four answers, and at least one of them was correct.

Annotation to measurements
Table 2 presents the scale features, based on the data of the total sample (n = 318). The teachers' individual scores were calculated as follows.

First questionnaire. Means of item ratings were calculated for all scales used in the first online questionnaire measuring participation motivation, computer attitude, computer anxiety, and usage of three selected learning strategies. All items were rated on a 5-point Likert-scale coded from 1 to 5. Higher scores reflect higher feature levels of teachers except for computer attitude. Higher computer attitude scores reflect a low negative attitude, which could be vaguely interpreted of as a "positive" attitude.

Module questionnaires. First, means of item ratings were calculated for the Effort/Importance and Pressure/Tension scales for each module. The one-item rating of intrinsic and overall load were taken as given. Then, means were calculated over the eight module scores. High scores reflect high loads.

Tests of prior knowledge and performance. First, test scores for domain-specific prior knowledge and performance were calculated as percent correct answers for each module. Then, means were calculated over the eight module scores.

Table 2: Means and standard deviations as well as the potential score range of the used measurements are shown.

	#I[1]	#A[2]	Range	M	SD	n	α[3]	#A[2]	M	SD	n
Participation motivation	7	1	1-5	4.00	.62	318	.84	1	4.23	.49	49
Computer attitude	9	1	1-5	4.23	.59	318	.80	1	4.19	.54	49
Computer anxiety	8	1	1-5	1.77	.63	318	.82	1	1.81	.63	49
Meta-cognitive strategies	11	1	1-5	3.43	.61	318	.81	1	3.56	.57	49
Time management	4	1	1-5	2.47	.90	318	.83	1	2.45	.87	49
Learning environment	6	1	1-5	3.99	.68	318	.80	1	4.02	.66	49
Prior knowledge	5	1-8	0-100	48.71	16.34	255	.45[4]	8	48.68	10.80	49
Intrinsic load	1	1-8	1-5	1.67	.63	159		8	1.69	.51	48
Overall load	1	1-8	1-5	1.70	.70	159		8	1.66	.56	48
Effort/Importance	5	1-8	1-5	3.33	.54	159	.59[4]	8	3.45	.44	48
Pressure/Tension	5	1-8	1-5	1.80	.72	159	.87[4]	8	1.91	.73	48
Performance	15	1-8	0-100	80.12	13.82	159	.56[4]	8	86.86	6.57	49

[1] Number of items used for assessment. [2] Number of assessments an individual score is based on. [3] Cronbach's alpha. [4] Mean Cronbach's alpha.

RESULTS
Correlations between variables
Table 3 provides an overview over the 66 correlations calculated between the variables under focus. We did not control for cumulative alpha error (e.g., applying the Bonferroni-Holm correction results in four significant correlations, i.e., all absolute values r ≥ .58) because considering only the largest correlations would not be helpful with interpreting the results of the subsequent regression analyses. Thus, we reported all significant correlations using non-corrected Alpha levels.

Table 3: Correlation matrix of variables.

		2	3	4	5	6	7	8	9	10	11	12	n
1	Intrinsic motivation	.15	-.18	-.03	.13	.12	.07	-.25[+]	-.34[*]	-.23	.10	.01	49
2	Computer attitude		-.75[***]	.14	.10	.04	.04	-.26[+]	-.34[*]	-.09	-.03	.20	49
3	Computer anxiety			-.08	.03	.09	-.12	.38[**]	.44[**]	.28[+]	.10	-.06	49
4	Prior knowledge				.00	-.01	.01	-.14	-.15	.05	-.08	.37[**]	49
5	Metacognition					.58[***]	.31[*]	.00	.07	.12	.34[*]	.27[+]	49
6	Time management						.42[**]	.14	.10	.25[+]	.13	.04	49
7	Learning environment							-.17	-.14	-.07	.07	.12	49
8	Intrinsic load								.71[***]	.45[***]	-.31[*]	-.17	48
9	Overall load									.72[***]	-.20	-.26[+]	48
10	Pressure/Tension										.03	-.18	48
11	Effort/Importance											.06	48
12	Learning performance												49

Note. [+] p < .10, [*] p < .05, [**] p < .01, [***] p < .001.

The pattern of correlations between the learner characteristics is very clear. The matrix shows four essential correlations among 21 calculated correlations. Computer anxiety highly correlated with computer attitude. Students with lower levels of computer anxiety reported more positive attitudes towards computers (i.e., the absence of negative computer attitudes). Furthermore, medium to large sized positive correlations were found between the reported usages of the three focused learning strategies. No other relevant correlations could be

observed.

Large-sized, positive correlations were found between intrinsic load, overall cognitive load, and pressure/tension, which all are subjective direct assessments of cognitive load. The higher that learners rated their intrinsic load, the higher was their experience of overall cognitive load and their experienced pressure and tension. In other words, the higher learners rated the content difficulty, the higher the difficulty of studying was rated, and their experienced pressure and tension. Effort/importance did only correlate significantly with intrinsic load. The more effort was reported, the less intrinsic load was experienced. For performance, some minor negative correlations with direct load assessments were found, but not with effort/importance. The higher the experienced load, the lower the score on the performance tests.

Medium-sized correlations were mostly found between the learner characteristics, intrinsic load, and overall load. Intrinsic motivation, computer attitude, and computer anxiety correlated significantly with these load ratings. Being more motivated and having a more positive computer attitude were related to experiencing less intrinsic and overall cognitive load. In contrast, being more anxious about computers was related to experiencing more load. That is, content and studying difficulty were rated higher. Pressure/tension as an overall load measure showed the same pattern of correlations as intrinsic and extraneous load, but correlations were weaker and negligible for computer attitude. In addition, time management correlated positively with the experienced pressure and tension. That is, reporting a higher level of time management was connected to a higher level of experienced pressure and tension. Prior knowledge and metacognitive strategy usage had a positive impact on performance. The more the students knew about the content before learning and the more they reported using metacognitive strategies, the higher their score in the final module tests. The indirect measure of overall cognitive load (i.e., the experience of effort/importance) only showed one significant correlation with metacognitive learning strategy usage. The more they reported using the strategy, the higher the experience of effort and importance.

Regression Analyses
All cognitive load measures could be modeled by multiple linear regressions on the learner characteristics in focus (see Table 4 and 5). Backward elimination models consistently resulted in a multiple correlation of between .34 and .52 and an explained variance between .12 and .27.

Table 4: Summary of models.

	R	R^2	Adjusted R^2	SE	DW	F	df_1	df_2	p
Intrinsic load	.38	.14	.12	.48	1.71	7.56	1	46	.008
Overall load	.52	.27	.23	.49	1.94	8.11	2	45	.001
Pressure/tension	.36	.13	.09	.70	1.85	3.36	2	45	.044
Effort/importance	.34	.12	.10	.41	2.25	6.04	1	46	.018
Performance	.46	.21	.18	5.95	2.03	6.25	2	46	.004

Table 5: Results of the multiple linear regression analyses (backward elimination).

		B	SE	ß	t	df	p	tolerance
Intrinsic load	(Constant)	1.13	.21	-	5.32	46	.001	
	Computer anxiety	.30	.11	.38	2.75	46	.008	1.00
Overall load	(Constant)	2.29	.70	-	3.29	45	.002	
	Intrinsic motivation	-.30	.15	-.27	-2.05	45	.046	.97
	Computer anxiety	.35	.12	.40	3.06	45	.004	.97
Pressure/Tension	(Constant)	2.97	.89	-	3.33	45	.002	
	Intrinsic motivation	-.39	.21	-.26	-1.88	45	.067	.99
	Time management	.23	.12	.28	2.00	45	.052	.99
Effort/Importance	(Constant)	2.52	.38	-	6.60	46	.001	
	Metacognition	.26	.11	.34	2.46	46	.018	1.00
Performance	(Constant)	64.49	6.72	-	9.60	46	.001	
	Metacognition	3.17	1.52	.27	2.09	46	.042	1.00
	Prior knowledge	.23	.08	.37	2.86	46	.006	1.00

Intrinsic load could be modeled by computer anxiety only. The higher that students reported computer anxiety, the higher their intrinsic load. Similarly, overall load could be modeled by computer anxiety and intrinsic motivation. Computer anxiety showed a higher predictive power on overall load than intrinsic motivation. The higher that computer anxiety was experienced, the higher the overall load. In contrast, a higher intrinsic motivation reduced the experience of overall load.

Pressure/Tension could be modeled by intrinsic motivation and time management. Both variables showed about equal predictive impact. The higher the time management scores, the higher that pressure and tension were rated by the learners. Conversely, a higher intrinsic motivation reduced the experienced pressure and tension.

The resulting model of Effort/Importance only contained the usage of metacognitive strategies. The higher that metacognitive strategy usage was reported, the higher the experienced effort and importance. No other variable remained significant in the model. Similarly, metacognitive strategies were also positively related to performance, but performance could also be modeled by prior knowledge. Prior knowledge appeared to be a stronger predictor of performance than metacognitive strategy usage. Students reporting higher prior knowledge and strategy usage performed better on the final module tests.

Self-correlation, homoscedasticity, and non-collinearity

The self-correlation of residuals per regression model was tested with the Durbin-Watson test. Values in the interval of 1.5 to 2.5 indicate the non-existence of self-correlations. For all of the resulting regression models, the values lie in the mentioned interval. Hence, the absence of self-correlation of residuals is assumed for all models (see Table 4).

Homoscedasticity was tested by the Koenker test (Koenker, 1981). Homoscedasticity was marginally violated for intrinsic load ($\lambda^2 = 3.99$, $df = 1$, $p = .05$) and overall load ($\lambda^2 = 5.22$, $df = 2$, $p = .07$), but not for Pressure/Tension ($\lambda^2 = 1.82$, $df = 2$, $p = .40$), Effort/Importance ($\lambda^2 = .23$, $df = 1$, $p = .64$), and performance ($\lambda^2 = 1.63$, $df = 2$, $p = .44$).

Non-collinearity focuses on the correlations between predictors and could be controlled by the statistic of tolerance. Values less than .10 are indicative of collinearity of predictors, whereas values near 1 are unproblematic. The tolerance indices of all regression models suggest non-collinearity of predictors.

DISCUSSION

One approach towards designing high-quality distance courses that meet the needs of students is to focus on identifying crucial learner characteristics of successful learners (Yukselturk & Bulut, 2007). Adopting this approach, we investigated how a set of motivational, affective, cognitive, and skill aspects of in-service teachers could explain their learning success when studying a script-based distance course about media education. In this section, we also discuss how the identified student characteristics assessed in this study should be considered when designing distance-learning courses.

Before the results are discussed, one point about computer anxiety and attitude should be noted. Although positive and negative computer attitude and computer anxiety are assumed to be independent constructs (Blignaut et al., 2005; Richter et al., 2010), research in distance learning has revealed high correlations between negative computer attitudes and computer anxiety (e.g., Stiller & Köster, 2017; Stiller & Bachmaier, 2018), including the current study. Hence, results of negative computer attitudes are not strictly separable from computer anxiety. This fact can be attributed to the special sample groups used in studies that have investigated distance learning. Distance and online learners could have a stronger correspondence between computer attitude and anxiety than learners in non-computer-based learning environments.

The analyses in the current study showed that domain-specific prior knowledge and metacognitive strategies had a significant predictive value for the level of performance, with prior knowledge showing the highest impact. This result reflects previous research findings about prior knowledge (Amadieu et al., 2009; McDonald & Stevenson, 1998; Simonsmeier et al., 2018; Stiller, 2003, 2009, 2017; Stiller & Bachmaier, 2018) and self-regulated learning strategies as represented by metacognitive strategies (Hart, 2012; Lee & Choi, 2011; Yukselturk & Bulut, 2007). The corresponding explanations are that prior knowledge makes it easier to assimilate new information and learning strategy usage makes it easier to build or to elaborate schemas, which leads to better test performance. Furthermore, self-regulation skills, represented by the usage of time management and metacognitive strategies in the current study, significantly correlated positively with experienced pressure/tension while learning and invested effort. These skills also remained as significant predictors in the backward regression models. Overall, these results indicate that self-regulation skills are important when arranging and organizing for learning and thus contribute to successful learning.

Intrinsic motivation has been proposed to play a significant role for successful distance learning, but it had no impact on performance in the current study. This result contradicts previous research at the first glance (Ali & Franklin, 2001; Aragon et al., 2001; Artino, 2008; Delialioglu, 2005; Fredericksen et al., 2000; Sankaran & Bui,

2001; Stiller & Bachmaier, 2018; Waschull, 2005; Yukselturk & Bulut, 2007). Thus, higher levels of intrinsic motivation appear to not influence students' studying and learning efforts and the resulting test performance. But intrinsic motivation had a significant predictive power for the experienced overall load and pressure/tension. Intrinsic motivation correlated negatively with overall load and experienced pressure. Students with a higher motivation reported a lower level of studying difficulty and pressure and tension while learning. These results indicate that intrinsic motivation contributes to learning success by managing cognitive load while learning, which is consistent with the literature on learning success.

Computer attitude and computer anxiety have also been proposed to play a significant role for successful distance learning, but they had no impact on performance, invested effort, and experienced pressure while learning. This result contradicts previous research on performance (Desai, 2001; Hauser et al., 2012; Saadé & Kira, 2009; Sam et al., 2005; Stiller, 2009, 2019; Stiller & Bachmaier, 2018). Thus, lower levels of computer anxiety and more positive levels of computer attitude appear to not influence students' studying efforts and their experience of pressure and tension and test performance. However, computer anxiety significantly predicted intrinsic and overall load, and computer anxiety correlated positively with intrinsic and overall load. Overall, these results indicate that computer anxiety only contributes to the experience of learning as being more difficult, as indicated by the subjective one-item ratings of content and studying difficulty, but not to more learning success.

Limitations

There are some limitations of the study that must be considered. First, the sampling method was inherently biased because only the best student teachers, who finished all training modules successfully, were selected. Thus, the results point to learner characteristics that predict knowledge acquisition among the best. These characteristics might not be the most important ones for students that had intended to work only on a few selected modules or students that had decided to drop out from training after completion of a view modules. Consequently, optimizing a course design according to the significant learner characteristics in this study might only foster learning in already successful learners.

Second, the distance-training course used in this study is one among many. It sets specific demands on learners that might differ from other investigated courses. The mixture of online introduction, offline learning, and online testing might not allow to easily generalize results to other distance courses, particularly when they use, for example, more interactive and dynamic media (e.g., simulations and videos) and group work. Learners confronted with other trainings with a defined set of demands might need other abilities to be successful learners. A better approach when investigating distance and online courses could be to first analyze the learning task and then identify abilities that a successful learner should have. Nevertheless, some learner characteristics and abilities might be important for any type of distance course such as motivation or learning strategies. When a learning task is easy and not very time consuming, however, students might still acquire knowledge when they are low in motivation and have low abilities in organizing their learning, for example, in rote learning.

Third, the analytical design also bears problems. As dependent measures, we used mean scores calculated over all eight modules for analyses. This procedure might result in underestimations of effects because learner characteristics, such as intrinsic motivation, computer anxiety, and computer attitude, might change when learners are studying over a longer time period. For example, distance and online courses might act as interventions that change computer anxiety and computer attitude (Dupin-Bryant, 2002; Woszczynski, Lazar, & Walker, 2004). Moreover, the student level of motivation is suggested to underlie fluctuations or might decrease when studying is not as satisfying as expected. Thus, when computer anxiety and motivation decrease and computer attitude becomes more positive, existing effects might be reduced because the scores might be less influenced by the changed learner characteristics. Finally, this was a nonexperimental field study, which would benefit from a replication study under more controlled conditions.

Conclusion

Overall, our results are consistent with former research when focusing on both objective performance and subjective cognitive load measures. From the perspective of learning strategies, we conclude that students should be supported in their self-regulation because a higher level of strategy usage is connected to a higher level of invested effort and performance and to a lower level of experienced pressure and tension while learning (e.g., Yukselturk & Bulut, 2007). Prior knowledge should also be considered when designing a training for reaching high performance levels. That is, training should be more tailored to student's prior knowledge. The overall experience of content difficulty and studying difficulty was linked to motivation and computer anxiety. Thus, a distance training should also be designed in a way to reduce computer anxiety (and to positively influence computer attitude) and to make learning an interesting event (Yukselturk & Bulut, 2007).

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APPENDIX

The following tables list the translated German items of the questionnaires used for assessments.

Table A: Items assessing intrinsic motivation, computer attitude, and computer anxiety were rated on 5-point Likert scales from "do not agree" to "agree".

Intrinsic motivation (scale "Interest/Enjoyment" by Ryan et al., 1982; authors' translation based on Leone, 2011)

1   I think I will enjoy studying the modules very much.
2   I think studying the modules will be fun to do.
3   I think studying the modules will be a boring activity.
4   I think studying the modules will not hold my attention at all.
5   I think studying the modules will be very interesting.
6   I think this activity will be quite enjoyable.
7   I think I will not enjoy studying the modules.

Computer attitude (scale "Personal experience/learning and working/autonomous entity" by Richter et al., 2000, 2010)

1   To me, the computer seems too unreliable to use as a learning tool.
2   I am often frustrated by the fact that the computer simply does not make sense to ordinary people.
3   When I use the computer for work, I constantly worry that it might break down.
4   Working with the computer is often frustrating because I do not understand the machine.
5   Sometimes my computer does things I do not understand.
6   The computer programs that I use for learning and working are sometimes hard to understand.
7   When I work with a computer, I feel that the computer does what it wants.
8   If I have computer problems while I am working, I feel helpless.
9   I wish I had to work less with computers.

Computer anxiety (scale "Confidence in dealing with computers and computer applications" by Richter et al., 2000, 2010)

1   I feel confident in using the computer.
2   I panic when my computer crashes.
3   In working with the computer, I am easily frustrated when problems occur.
4   Working with the computer makes me uneasy.
5   When working with the computer, I am often worried that I might break something.
6   I feel that I cannot really control my computer.
7   If possible, I avoid working with the computer.
8   In the case of occurring computer problems, I stay calm.

Table B: Items assessing learning skills were rated on 5-point Likert scales from "very rarely" to "very often".

Meta-cognitive strategies (Griese et al., 2015); (p) = planning, (m) = monitoring, (r) = regulating

1   I try to consider beforehand which areas of certain topics I have to study and which I do not have to study.(p)
2   Confronted with a difficult subject matter I adapt my learning strategy accordingly.(r)
3   If I do not understand everything I am reading, I will try to make a note of the gap in my knowledge and sift through the material again.(r)
4   I decide in advance how much subject matter I would like to work through in this session.(p)
5   Before starting on an area of expertise, I reflect upon how to work most efficiently.(p)
6   I plan in advance in which order I want to work through the subject matter.(p)
7   I ask myself questions on the subject matter in order to make sure that I have understood everything correctly.(m)
8   In order to find gaps in my knowledge I sum up the most important contents without using my notes.(m)
9   I work on additional tasks in order to determine if I have truly understood the subject matter.(m)
10   In order to check my own understanding I explain certain parts of the subject matter to a fellow student.(m)
11   When an aspect seems confusing or unclear, I examine it again thoroughly.(r)

Time management (Griese et al., 2015)

1   I work according to a schedule.
2   I decide on the times for my learning.
3   I fix the hours I spend daily on learning in a schedule.
4   Before each study period I appoint the duration of my work.

Learning environment (Griese et al., 2015)

1   I work in a place that makes it easy to concentrate.

2	I design my work environment in a way that I am distracted as little as possible.
3	When learning I always sit at the same place.
4	When studying I make sure that I can work uninterrupted.
5	My workplace is designed in a way that makes it easy to find everything.
6	At my desk I have the most important papers within reach.

Table C: Items assessing cognitive load were rated on 5-point Likert scales from "do not agree" to "agree".

Intrinsic and overall load ratings (by authors; authors' translation)

| 1 | The content of the module was well comprehensible. (intrinsic load) |
| 2 | Studying the module was very difficult for me. (overall load) |

Indirect measure of overall load (scale "Effort/Importance" by Ryan et al., 1982; authors' translation based on Leone, 2011)

1	I put a lot of effort into processing this module.
2	I didn't try very hard to do well at processing this module.
3	I tried very hard on processing this module.
4	It was important to me to do well at processing this module.
5	I didn't put much energy into processing this module.

Direct measure of overall load (scale "Pressure/Tension" by Ryan et al., 1982; authors' translation based on Leone, 2011)

1	I did not feel nervous at all while working through this module.
2	I felt pressured while working through this module.
3	I was very relaxed in working through this module.
4	I was anxious while working through this module.
5	I felt very tense while working through this module.

SOCIAL NETWORKING AS AN E-LEARNING TOOL FOR GAINING TECHNOLOGY RESOURCES USING GENETIC ALGORITHM

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ABSTRACT
Social networking is used widely by all the users for sharing their knowledge. Face book, Twitter, LinkedIn are the very commonly used social networking applications. used social media. The students have various groups in these social networking applications for sharing the knowledge related to their domains. Since most of the time, the students spend their time on social media, it has become very vibrant to aggregate the resources related to the education. In this paper, we have highlighted the abundant use of social networking to improve the learning through e-platform. This paper explores the role of Social Networking Sites (SNS) in e-learning by investigating the attitudes, behaviors, knowledge and views of computing students towards the use of SNS in e-learning. Online social networks (OSNs) have gained popularity among users from all over the world during the past few years. And E-learning has made learning process quite convenient for users by using the networks. Data was collected from an online survey and interviews, and analyzed to discover the practices, tendencies and the current status of the use of SNS in e-learning as well as how these can be improved. By combinning OSNs with E-learning is a new idea. And the role of OSNs in students' E-learning experiences is focused on in this paper. And it is believed that online social networks can be effectively used in E-learning in the future. We believe that SNS can play a major supporting role in e-learning and that the potential for using SNS in e-learning is not fully reached. The situation may be improved by providing increased guidance and training to students. Learning activities using SNS should be planned and organized. Brief guidelines on using SNS in e-learning are also included in this paper.
Keyword: Social networking sites (SNS),Online social networks (OSNs)

INTRODUCTION

The internet has huge volume of users around the world. Everyone is using the social media applications as a common platform for sharing the information. It is very potent that when the user immediately shares the information, it is getting disseminated instantly to all the users who are using the social media applications. Though the shared information is accessible to every user, only the users who are closely related to that information domain have the maximum utility. In connection with this, the education related information shared by the students play a very crucial role in the social media applications. Students share their course related materials with their peer group users and they interact with experts for enhancing their knowledge and clarifying their doubts. In the last decade, e-learning facilities have increased in academic applications.

Their uses have risen in higher education and have almost changed the learning modes of the student communities. The engineering domain is clearly aware of this ever-growing scenario, and using it for implementing effective learning strategies to the modern young minds. And also the applications of electronic learning have started dominating various platforms that involve online, distance and traditional university education systems. E-learning is a web application, which is used to share the content, and to manage, disseminate, and monitor the educational activities of an organization through online activities. A few of its highlighted functions are to manage learners, learning resources, learning object materials and activities, to control access, monitor the learning process and to make evaluations. It can also be stated that the use of information and web technologies in learning is being encouraged through the use of e-learning systems.In this paper, section 2 describes the related works of the social networking applications in e-learning. Section 3 explains in detail about the proposed social media based
e-learning systems.

RELATED WORKS:

The USDLA was formed in 1987. At that time when "Power users" were boasting of their Intel 386 processors. In that context, DL was a concept well outside the education mainstream. It Granted few people who know

something of the process but hands-on DL experience was rare. USDLA, then, provided a means for these pioneers to find one another[3].MOOC provides low-cost courses and the potential to expand and include a broad diversity of educational levels, MOOC is acquiring power and popularity. Like MOOC, STEM grabbed a large share of available online courses provided by MOOC platforms MOOC have the potential to allow children who are homeschooled to pursue their education from their homes [4].

E learning is Web based learning where we can learn essential content at anytime, anywhere. Ontology was familiarized in this model to support the conceptualization of certain domain because it was based on reusability[5]. Here the Resource Description Language (RDF) and the Web Ontology Language (OWL) is providing a language and structure for describing all ideas and concepts in the universe and then relating these to each particular subject area[6].The mobile learner is increasing the learner"s capability physically anywhere. This is the intention to increase research and changes and maximize the potential of mobile learning[7].

In this paper the benefits of information structure, oriented to services are discussed. There are still a series of problems, and a way for a wide solution is to make interoperable services. It proposes that using ontology and with semantic focus will solve the difficulties[8]. In this paper, they make a case for why ontologies can contribute to block chain design. For this, they analyze a traceability ontology and translate some of its representations to smart contracts that execute a provenance trace and enforce traceability constraints on the Ethereum blockchain platform.[9] This SARA voluntary, regional solution was developed through a lengthy, collaborative process that brought together major stakeholders in higher education[10]. In this paper they discuss the explicit representation of the semantics of data, accompanied with domain theories (ontologies), which will enable a Web that provides a qualitatively new level of service[11].

Several works of artificial intelligence are used in adaptive e-learning to give the learner a content adequate to his profile in the literature we find: Hawkes and Derry [15] have used the informal fuzzy reasoning in the TAPS system to determine with uncertainty the solution that the student has built among those of the system (models). Ruiz et al. [11] have modeled an adaptive hypermedia system, called Feijjo.net, based on the learning style. The system uses fuzzy logic to determine the learner's style from the CHAEA questionnaire.

Chrysafiadi and Virvou [17] have proposed a learner model that represents the learner's knowledge through the overlay model (presented concepts that the learner master with "1" or with the word "known" and those that do not master by "0" or unknown), the fuzzy logic allowed to define and update the level of knowledge of each concept, with each interaction with the e-learning system.

Martin and VanLehn [18] have presented OLAE as an assessment tool that collects data from students solving physics problems in college. For each problem, OLAE automatically creates a Bayesian network that calculates the probabilities indicating the rules that the student uses.

Viccari et al. [12] have introduced AMPLIA, an intelligent learning environment used as a training tool in the medical field, the system combines bayesian networks with cognitive.There are also works that use genetic algorithms for adaptive e-learning, namely:

In [11] the Researchers describe an adaptive system con-ceived in order to generate pedagogical paths which are adapted to the learner profile and to the current formation pedagogical objective. They have studied the problem as an "Optimization Problem" using Genetic Algorithms, the system seeks an optimal path starting from the learner profile to the pedagogic objective passing by intermediate courses to prepare the courses for adaptation.

In [17] a genetic algorithm based adaptive learning scheme for context aware e-learning has been described, the Re-searchers defined a new three level structure for learner's context comprising of the content level, presentation level and media level is defined. The learning path generation algorithm now evolves into a learning scheme generation as it generates a learning path accommodating the entire learner's context.

SOCIAL NETWORK ORIENTED E-LEARNING SYSTEM:
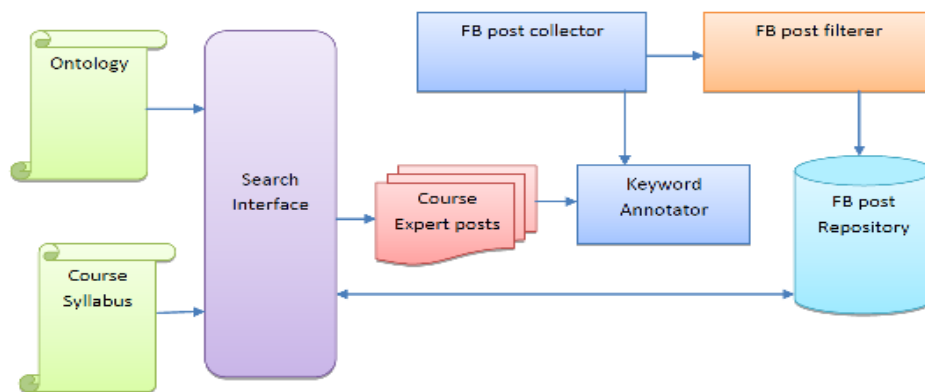
Figure 1

In particular, the system initializes a unit for collecting learning materials by setting target concepts in the input domain ontology and associate different course experts to share educational posts on a specific topic. The e-learning based supportive learning system mainly encompasses the ontology, expert shared post, Keyword annotator, FB post collector, FB post filtering system and the FB post repository.

FB Post Pre-Processing Or Filtering:

It allows transforming the original FB posts from the facebook into a common format to be used by mining tasks. Thus, before applying various mining techniques, general data preprocessing tasks have to be completed. The ontology is the hierarchical representation of course details that belong to the corresponding subject . In addition to the collected

FB posts using input ontology, the posts relevant to the subjects are created and posted Ontology,Course,Syllabus,Search,Interface course,Expert posts,FB post collector, Keyword Annotator,FB post filterer,FB post,Re pository by the experts. The expert posted posts are annotated, using keyword terms. The annotated posts are stored in the FB post repository.

Integration With The E-Learning System
The FB post collection and filtering related tasks are integrated into the e-learning environment. All data pre-processing and post-processing are carried out into a single application.
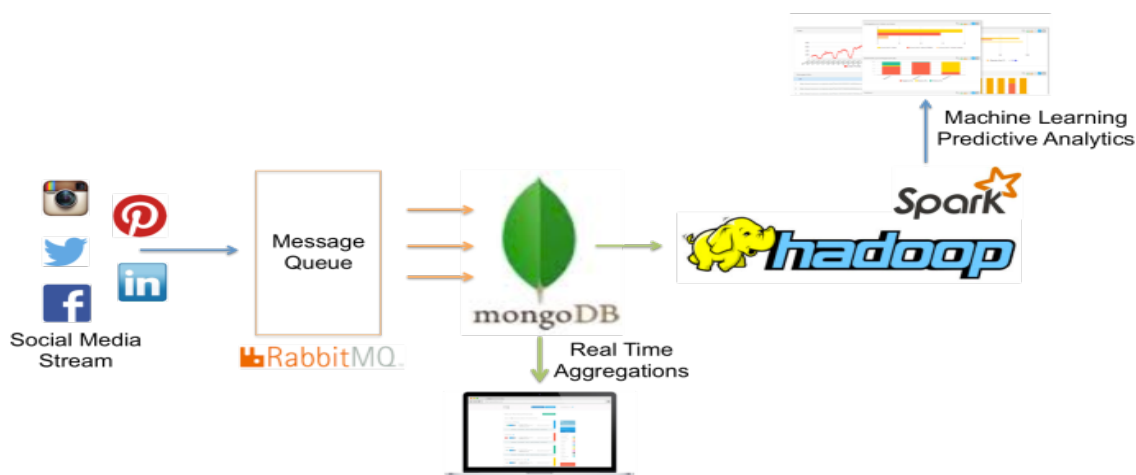
Figure 2

Facebook was identified as the most popular SNS. Also YouTube and Instagram are identified as the most used SNS. To improve and enhance the method of learning the following algorithm is suggested in this paper.
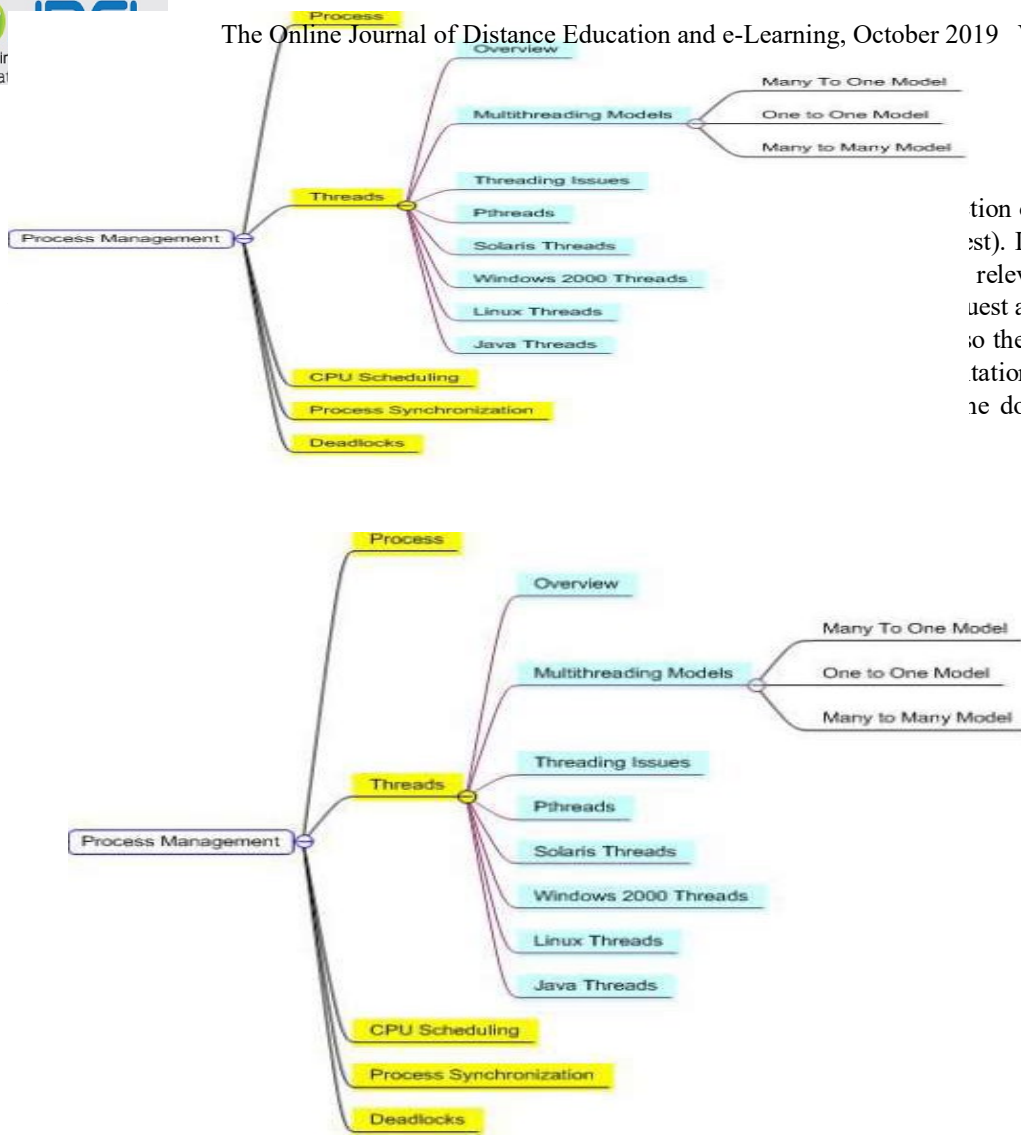
tion of objects (mostly
...st). In the Information
...relevant to it, the way
...uest and that document
...o the request that is to
...tation [2], where each
...e document or in the

Figure 3

Our corpus in our case contains the documents that represent the learner's objectives, the first thing to do is to extract all the terms or concepts in the corpus, and for each document construct a vector That represents it, if a term exists in the document we calculate its weight and if not we put 0, at the end of this operation we construct a vector for each document to calculate the similarity between the profile of the learner and each pedagogical objective.

ALGORITHM: (Blog-Ranking)

Genetic algorithms (GAs) are stochastic optimization algorithms based on the mechanisms of Natural selection and genetics, their operation is extremely simple, we leave with a population of potential solutions (chromosomes) initial selected arbitrarily, we evaluate their relative performance (fitness). On the basis of these performances, a new population of potential solutions is created using simple evolutionary operators such as selection, crossing and mutation. This cycle is repeated until a satisfactory solution is found [3].In our work we use a simple GA, which consists of iterating the following three operations: reproduction, crossing and mutation, the population created during each iteration is called a generation and it's noted P_t.

There has been an increasing interest in the application of GA tools to IR in the last few years. Concretely, the machine learning paradigm, whose aim is the design of a system able to automatically acquire knowledge by themselves, seems to be interesting on this topic. The first thing in a genetic algorithm is the definition of the initial population (selection operator or evaluation) on which we will apply the treatment as in our case it is to show the documents (educational objectives) relevant to the profile of the learner using the cosine similarity that will play the role of fitness function which is a very important parameter in GA because with it we can decide whether an individual is going to be selected or not. There is a lot of methods to make the selection like the biased lottery, the elitist method or the selection by tournaments.

The calculation of the weights of terms or concepts in each document is calculated by the following formulas:

$$P \, oid(t_i; r_j) = IDF \qquad \text{Equation 1}$$

$$TF = \frac{f(t_i; r_j)}{N}$$

Equation 2

$f(t_i; r_j)$ is the number of occurrences of the term t_i in the document d_j and N is the total number of terms in the document

$$IDF = \frac{\log(f(t_i; r_j))}{M}$$

Equation 3

$f(t_i; r_j)$ Is the number of occurrences of the term t_i in the document r_j and M is the total number of documents in the corpus.

The similarity used in our work is the Cosine similarity. This measure uses the complete vector representation, i.e. the frequency of the objects (words).Two objects (documents) are similar if their vectors are confused, the formula is defined by the ratio of the scalar product of the vectors X and Y and the product of the norm of X and Y.

1)   Randomly choose the initial population $Z(0) = (z1, z2, \ldots zn)$
2)   Each Chromosomes Fitness $F(zj)$ is computed.
3)   Apply Blogs ranking by mating current chromosomes, then by applying mutation and recombination as a parent chromosomes mate.
4)   Delete the left out population to make room for new population.
5)   Compute IDF and TF to compute new fitness
6)   T:t+1, if not move to step 3 else stop and return the optimized result.

EXPERIMENTS AND RESULTS:

The content based importance is used to measure and retrieve the FB post contents related to the query content. Ranking is the process of sorting out the blogs based on the order of their content relevance with respect to the user query. The user enters a search term, and in response the blogs relevant to their content are displayed. The blogs are ranked based on the relevance of the blog content using the blog ranking algorithm. The query term helps to retrieve the bins that match with the given input keyword. The retrieved bins include super classes, sub-classes and the peer bins that have been requested by the query term. Once the bins have been retrieved, the resultant blogs are converted as blog objects that help to maintain the blogs in a general data format. The fuzzy probability is computed for the resultant blogs using the Equation. The computed probability value is taken as the CBI value for every blog. After computing the CBI values for all the blogs, the blogs are sorted on the basis of the calculated CBI values.

In the very first stage of ranking the blogs, the individual blog's rank value is computed for the given keyword. The rank value refers to the CBI value, that is, how much content, relevant to the user query the blog contains. The blogs have been ranked based on the computed CBI value. The Table displays the details of the blogs retrieved for the keyword "Apple"; 16 blogs have been retrieved in 41 seconds. The blog URL is used for locating the particular blog where the query relevant blog contents exist. The content richness of the blogs is estimated by the calculation of the CBI value, often referred to as the rank value which is taken as the key ingredient for ranking all the blogs.

When the results are compared with the existing keyword based method, the proposed CBI-based blog ranking method retrieves the most relevant, personalized blogs in a sorted order of relevance for the user. The ontology diagram shows the precision and recall values for all the existing blog search engines. The tabulated values show that the precision value is high for the blog ranking system, and the recall value is also preserved. The statistics of the collected blogs from various search engines shows, that the number of blogs retrieved for each keyword is high. It is very clear that except for a few, most of the retrieved blogs are irrelevant. Blog search engines like Blogpulse and Blogscope start with zero precision and recall. It shows that the very first blog listed for the keyword "apple" is not relevant to the query.

Blog search engines like Technorati and Icerocket start with very high precision and recall, which is not preserved because the number of blogs retrieved is high. Regator is not a popular search engine; it can retrieve only less number of blogs, and it also fails to preserve its recall value.The experimental results show that the blog ranking system ranks the blogs according to the relevance of the blog content and user profile. It also yields very high precision and recall. The blog ranking system and its corresponding graph have been plotted. Though the blogs have been ranked based on their content, most of the times the retrieved number of blogs for a specific topic is extremely high. Sometimes the blogs may be similar in their content, or even may have the same content. In such cases, summarization takes an important role. Generally summarization is the process of giving the contents in brief by collecting the information on a common topic. In case of blog summarization, initially the collected blog contents are split into various sentences (S1, S2, S3…Sn). The term frequencies of all keywords are computed for each sentence. It is also necessary to compute the similarity of the sentence Si to the query word „q‟. In some cases the sentence may not have the same word as the query term, but the semantics may appear in the sentence.

 The sentence is checked for word matching in terms of semantics, equivalence and relevance .Sentences with more than 75 percentage of stop-words don't yield any useful information. So, those sentences would be removed from the sentence collection. The mean value of TFIDF, cosine similarity and word matching are calculated to find out the highest mean valued sentence. After calculating the mean value for sentences, the top five meaningful sentences are selected for giving the summarized content. The subject in the ontology and the frequency of the corresponding subject blogs are summarized.

The experimental results show that the proposed work performs well when compared with the existing blog search engines like Technorati, blogpulse, blogscope, icerocket, and regator. The blog summarizer retrieves only the blog relevant to the query, with a meaningful summarization and minimal number of blogs. The number of blogs retrieved using various search engines for the selected keywords. The blogs retrieved using search engines, contain a huge amount of irrelevant blogs. The experimental results show that the TPBRS yields better results. It is inferred that the number of blogs retrieved for each keyword is very high and the relevance is very low. The semantic blog mining framework uses the ontology to collect the relevant blogs from the blogosphere,then remove the irrelevant blogs and create the relationship between blogs before storing them in the repository. In this framework, the blogs stored are relevant to the subject, which makes the search process easier, and reduces the search time as well as the user ambiguity.Since the collected blogs are preprocessed and semantically related, only the relevant blogs are retrieved for the user. Hence the relevance of the blogs is completely (100%) achieved.

Alongside other SNS like Facebook and TwitterInstagram , YouTubeis also becoming popular as it's increase of use in the field of learninghad improvedas shown In graph(figure4&5).
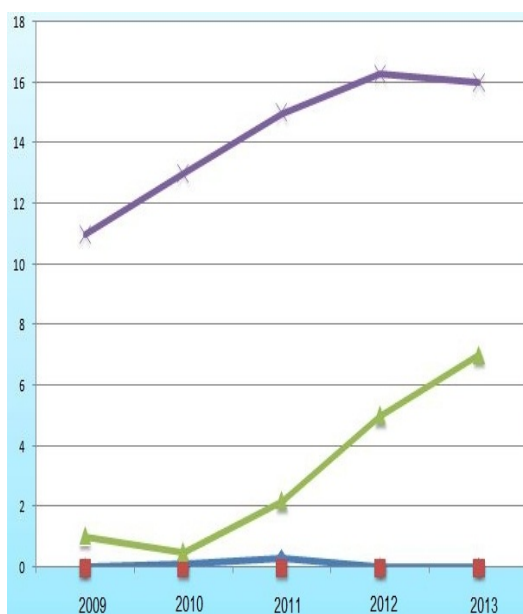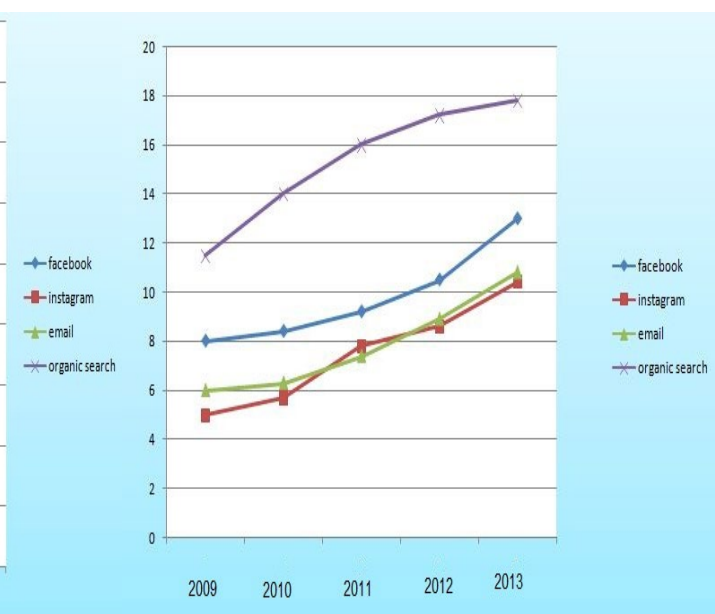

Figure 4   Figure5

CONCLUSION AND FUTURE ENHANCEMENT

Blogs are the authoritative sources of both technical as well as personal information. As the blogs are spread over the blogosphere, ranking contributes its role towards analysing the bestrelevant results to the user queries. Indexing has an important place in the process of blog ranking. Especially, user given keyword based indexing provides intuitive and efficient blog ranking results. In addition to indexing, the similarity analyser performs the process of checking the blog relevance by computing the cosine similarity of blogs to improve the ranking results. The blog ranking algorithm (BRA) involves the computation of the content based importance (CBI) values of the blogs, to provide better results in response to the user query. The optimized results is obtained with the genetic algorithm strategies. Summarization takes into consideration the various blogs on a similar topic, computes the mean value of TF-IDF, then summarizes the blogs, and provides the brief content by combining the highest mean valued TF-IDF sentences.

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THE COMPLEXITIES OF DISTANCE EDUCATION, ONLINE LEARNING AND USE OF TECHNOLOGY IN LEARNER SUPPORT SERVICES

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ABSTRACT
This article examines the complexities of Distance Education, online learning and Use of Technology in Learner Support Service in higher education in Kenya**.** Learning at higher education has gone though several changes since the invention of new technologies which can be used to enhance teaching and learning. In the field of education in both developed and developing countries, the impact of technology is being felt from the learners, teachers and community perspective. Distance education which has been used for ages in various higher institutions of learning changed a lot in its mode of delivery because of the use of various technologies. Since then, institutions have embarked on online learning which uses technology more. The paper tries to identify varies type of support services which are offered by distance learning and how technology has created an impact on the services and how the education provides view technology in education. Tutorials and pedagogy are some of the key support services in the distance learning programmes. The findings of the study also indicated that lecturers were ready to adopt and use technology in course delivery as it is capable of improving the quality of teaching by distance and in online platform and also is capable of improving their interaction with the learners. The major conclusions of the study was that technology if fully integrated in the teaching and learning process, will have benefits in access to education, cost reduction, improved syllabus coverage and good leaner and tutor interaction amongst others.
Keywords: distance education, information and communication technologies, teaching, pedagogy, student support services

1.0 Introduction

Education institutions are changing to new method of teaching and leaner support services. Many institutions which are using distance education are now forced to conform and use technology in their delivery. Kember (1990) noted that many students who are new in tertiary study are faced with the need to learn new conventions and recognize quite different conceptions of knowledge. This type of knowledge will be useful as they embark further in their studies. The role of universities in assisting new students is to take the leaners through a good orientation process to enable them understand how the university courses can be offered in different modes and the services available to all leaners.

Many changes have taken place in education but some concepts still remain the same. One of this is distance education which online learning borrows a lot from. According to Stella and Gnanam (2004):

Traditional campus based education is no longer the only mainstream delivery mode. Due to technological developments the last two decades has seen a significant increase in different forms of education and new education providers that have a global impact. They include a wide range of provisions that overlap, notably Distance Education programs that are delivered through satellites, computers, correspondence or other technological means across national boundaries twinning arrangements… pp 143.

According to Larreamendy-Joerns and Leinhardt (2006) they make a connection between the history of distance education and contemporary online education because the visionary promises and concerns that many current educators claim as novel actually have a past, one whose themes signal both continuities and ruptures. In essence, the genealogy of distance education can be traced form various perspectives one of them being the fact that:

The history of distance education constitutes not only a repository of experience with heuristic value but also the frame within which community of educators and the public at large may make sense of online initiatives (Larreamendy-Joerns and Leinhardt (2006)pp. 568

Keegan (1996) denotes that, despite the changes in distance education, its core features separation of instructor and learners, and the use of technology to enable communication between instructor and learner remain the same. Although many alternative terms like online learning, E-learning, mobile learning, and others are being

used, definition of distance education still and others like online learning still varies in scope and critical features(Holmberg,1986).He further noted that, distance education includes the various forms of study at all levels which are not under the continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises, but which nevertheless, benefit from the planning, guidance and tuition of a tutorial organization.

Online education forms the backbone of modern learning but it is still not equally practiced in most countries especially in developing countries where access to education for all citizens is still a challenge. However, it is advisable that in all circumstances, there is need for universities to closely examine their capabilities and capacity of their institution before overhauling the mode of delivery which has been in existing for some times. These arguments are predicated on a general assumption that students coming into universities have had a comparatively universal and uniform digital upbringing (Gregor et al.2008). It is assumed that the technological experiences of students are more or less homogeneous and that most, if not all, incoming university students are Digital Natives (ibid). It cannot be assumed that all students joining university at the same time have the same experiences in use of technology because of their various social and economic backgrounds, previous schooling locations and exposure to technology hence the need to treat each student differently in respect to use of technology in education.

In Kenya, the first government report which recommended other ways of acquiring higher education was the Ominde Report of 1964/65.It recommended the introduction of degree courses to be undertaken at the University College, Nairobi as part–time studies supplemented by short residential sessions. The Kenya National Development plans of 1966 and 1970) proposed the establishment of the external degree program. While according to Republic of Kenya Report (1999), the massive expansion of technology and the need to keep a breast of it was recognized .Since then various institutions have started distance learning programmes in a way to meet the needs of various cadre of their clientele.

2.0 Changing Trends in distance education

Distance learning (DL) is not a new mode of delivery as it has been there for several years. In England, correspondence courses have existed as early as the 1840s. In the United States of America(USA)the University of Chicago is noted to have established a correspondence course unit by 1890s (Bates, 2004). At the University of British Columbia, where distance education has been since 1949, more than 105 courses are offered through this mode (University of British Columbia, 1998b). The revamped transformation in delivery and administrative structure in offering distance education has taken a major toll in most higher education institutions as they strive to use more Information, communication and technology (ICT) in supporting the learning process. Another successful distance program was realized in the Northern Virginia Community College which has matured as an American community college. Composed of five campuses, plus the extended learning institute, it serves the Virginia suburbs of Washington, DC. Its students come from Urban, suburban, and rural communities, covering every possible socio-economic and cultural group. The college enrolls over 59,000 different students a year (almost 21,000 fulltime equivalent students), with distance education being approximately 5% of the total college enrolment. A number of factors led to NVCC's ability to develop its distance education program into the large and diversified one that exists today. Some were the result of carefully planned strategies. Others were fortuitous accidents, unexpected outcomes, or pure luck that became part of the institutions' overall distance education strategy. The early years of distance education at NVCC had a strong instructional development focus *(*Haney, Lange, & Barson, 1968).

The way education is being offered to learners especially in universities have had a trajectory path with various universities developing various strategies of attracting students into their programmes. This has also been the case in distance education programmes whereby more universities are now using technological devices than before. Some of the old providers of distance education like The Open University of United Kingdom (OUUK) provide programmes to several undergraduate and postgraduate students wherever they are hence meeting the needs of global education. In India, the same scenario is replicated at Indira Gandhi National Open University (IGNOU) which also has millions of students underrating various courses in different parts of the world.

Distance education is also available in African Universities .In Kenya for instance, the university of Nairobi has been offering distance education especially the bachelor of education Arts programme has been in existence for over 30 years but prior to that, the university was offering short correspondence courses to deserving individuals who needed to develop various competency based skills. Kenyatta University in Kenya and other universities have also been meeting the needs of various students by offering distance learning programmes using various modes of delivery. One common characteristics of this distance learning programmes is that the various

institutions have integrated technology in the services offered to students hence it is not the old distance education of pen and paper under brick walls.

Schwab (1962) examined the history of distance education in three major themes: democratization, liberal education and instructional quality. Democratization here means the increasing either access to higher education of the population that would be otherwise excluded, or increasing the range of people who might be served by the elite intuitions, liberal education in this case refers to education which is broad, deep, and philosophically anchored to sense of purpose and general utility as it attempts to shape a person's critical and analytic competencies with respect to disciplinary knowledge. And instructional quality refers to concerns and considerations about the effectiveness of teaching or instructional environments in the light of particular learning goals and educational standards. This history supports the progress of distance education as it moves to integrate more technology in its delivery.

The changes in distance education have had impact on the students, the distance education providers and other education stakeholders. 'Tried and true' print; audiotape and videotape materials, telephone communication and 'snail mail' are now enhanced by interactive technologies such as electronic mail and computer-mediated conferencing, making web-based instruction feasible for large numbers of people *(*Keegan, 1996; Khan, 1997). With the integration of emerging technologies, leaner support services have also improved as noted by Bates (2004) and Keegan (1996) who stated that new technology connects learners and instructors wherever they may be for example, home or work, provides opportunities for cross-cultural discussion and collaborative project work, and enables learners to control when and where learning occurs.

Distance education enhances access to learning which is realized even at the University of Nairobi. This was confirmed by the records at the School of Continuing and Distance Education (SCDE, 2014) where student's population especially in the department of educational Studies has been at a round figure of about six hundred students per intake which is among one of the highest intakes at the University of Nairobi. SCDE has consistently offered the bachelor of education programme for a period of over 30 years through the distance mode using the Print media, cassettes, face to face tuition during the school holidays and other support services received by the students during their home study at the Extra Mural centres located in every County in Kenya. This trend has changed and the programme has since enhanced the learner support services through use of more ICT services in learner support services like library, tutorials, administrative services, examination management and other aspects of the course.

3.0 Effects of Technology on distance education instructional design
Various schools of thought believe that offering distance education in a more modern way with use of emerging devices can have an impact in the oldest mode of education delivery.

s old mode of delivery. Navarro et al. (2000) noted that the multimedia design of distance courses can enhance student learning and comprehension. While Sosin(1997) indicated that from an administrative position, online courses offer the opportunity to reach a large number of nontraditional or under-served audiences and afford greater flexibility in scheduling classes. These sentiments support the current status of distance education which has since then proved to be flexible as it takes leaner's from different backgrounds who then take the various courses wherever they are through use of technology and other enhanced leaner support services. Navarro (2000) noted the current trend in distance education and stated that'

'Today, most distance courses use digitized lectures, audio supplementation, discussion boards, and interactive software to incorporate the active use of writing, problem analysis, and collaborative learning'.

In its offer, distance education is as good as face teaching since it takes into account all the processes of effective learning and quality control measures. The opportunities that computer-mediated conferencing affords for collaborative, case-based and problem-based learning, as well as self-directed learning (*Grow, 1991; Bridges, 1992; Dede, 1996*). Szabo (1998) noted that, distance education enhances access to learning and can increase learning efficiency and achievement. While Threlkeld and Brzoska, *1994)* stated that *distance* education can be at least as effective as face-to-face education .

Students support services are changing everyday as new ideas and concepts come into play. Because of the separation, the learning experiences are conveyed mainly through a learning package coupled with various forms of human support mechanism. A learning package or course or training material may consist of the printed text and other media and materials which are supported by trainers, tutors, facilitators and counsellors (Rowntree, 1991).

As institutions change their distance education delivery strategies, it is believed that the potential of electronic device to change the way education is being offered in higher education is still a priority area. Several methodologies are available for developing and delivering distance programs in various higher institutions and each has different attributes and characteristics. Various technological devices like CD-ROMs though updated, pen drives are capable are storing large volumes of information but the trend has since then changed and they are new ways of storage online storage like online storage apps, online storage google, auctions and many more are currently in use more than the old ones.

4.0 Different modes of distance education and benefits

 Obonyo-Diglolo (2009) in his study indicated that pedagogy in Kenya initially was conducted using two modes of delivery, namely the conventional and the distance teaching modes. This has since then changed and more innovative approaches are developed for use in education. Conventional teaching refers to the delivery of lesson to leaners assembled in front of a teacher. Appelberg (1997) noted that, distance learning as a choice for non traditional older students as well as for practicing professionals is on the increase. Concurrently, demands for instruction to meet needs in the rapidly changing workplace (Adi, 2002) and advances in technology and offer both virtual and real-time two way interactive teaching and learning (Alvarez et al, 1998) have combined to make distributed learning environments both necessary and possible. Additionally, increasing demands on available on-site resources for education make distance learning (DL) appealing for major institutions of higher education. A further challenge for institutions is to select and support technology to deliver distributed learning instruction.

According to Bates(1995) and Keegan(1996),the various technologies in education connects learners and instructors wherever they may be for example, home or work, provides for control when and where learning occurs. Depending on the degree of standardizations of course and delivery methods, online learning may ensure consistency in content and process. Distance education at basic level is considered to takes place when a teacher and student's physical distance is bridged by technology for example voice, video data and print to close the instructional gap (Johnson, 2002). These types of programs are believed can give a second chance to college education, as it can enable those disadvantaged by limited time, finances or disability to update their knowledge base (Juma, 2004). Distance education continues to grow with more colleges offering courses and programs while experiencing increased student enrollment

Distance education since its inception has served the needs of leaners with differ requirements and in different geographical locations but though face to face or through technology. Africa is one continent which has all the reasons to enhance distance education and online learning because of the various challenges realized in the education sector. Barrow(2004) notes that the continent is characterized by underdevelopment, poverty, increasing student population, financing of higher education and even unavailability of technology.

With the proliferation of many devices for learning and teaching purposes, many institutions need to take advantage of their presence .For instance, multi-media, CD-ROM, mobile phones, laptops, ipads te represent a significant wave in educational technology which if well exploited for academic purposes, can create an impact in the education system offered in developing countries especially where the education challenges are pronounced. Chute et al. (1999) asserted that, distance education offers an increased clientele base, improved services for students and more efficient use of existing facilities.

Papcharis et al. (2000) were able to report the results of a meta-analysis of 122 separate studies that compared individual with group learning with technology for various age groups. These authors found that learning in pairs was slightly more effective than learning individually despite the fact that there were differences according to: How the groups were composed that is Mixed-ability pairs did better than similar ability ones; secondly. The difficulty of the task showed that groups did better than individuals on more difficult tasks; thirdly, the nature of task that learners performed on closed than on open-ended tasks; and finally , on the gender, same-sex pairs did better than mixed-sex ones.

5.0 Research Methodology

The study was conducted at the University of Nairobi Kenya starting the period 2015 and ending 2017. Survey design was used and the study targeted students who were enrolled in distance education programme, their tutors, ICT and administrative staff. Stratified sampling was used in selecting students and administrators targeted for the study while random sampling was used for selecting lecturers and ICT staff. Questionnaires and interview schedules were used to generate information from the target respondents. Tutorials were one of the major variables of the study in this research. It covered the aspect of teaching and the learning process. The leaner support centres outside Nairobi were also targeted in the study since they give an overview of the support

services available outside Nairobi for the learners and especially on how technology is being used to serve the leaners better and ensure quality in the programme.

6.0 Findings on technology use in distance education

The study realized that, readiness to adoption ICT for teaching and administrative services is quite high as 77.7% of the lecturers out of the 45 who answered the questionnaires indicating their willingness to adopt to technology. While among the student respondents, the students' responses, the most highly rated elements of quality of teaching was the components where technology has been integrated and indicated good results were like administration of term papers, continuous assessment tests and release of examination results, processing of transcripts using ICT and access to information by students wherever they are. This study supports a study carried out by Gakuu (2007) which noted that, as instructors get more familiar with DE, and as their level of experience increases, the rate of adoption is bound to increase.

The respondents especially lecturer's preference of face to face teaching was still 50% as some lecturers still prefer face to face teaching against use of modern technology.

There was an urgent need to have more ICT enhanced services at the extra mural centres which are the key learner support services points at the University of Nairobi for the DE program. This will ensure relevance of information to the students by their tutors and even access to relevant study materials.

Mobile phone services by lecturers was one of the technologies which was mostly used because it is affordable, available amongst the students, faster and easier to use and the cost of using it to send short message services (SMS) is quite affordable even to the students.

Quality of teaching realized a mean grade rating of 4.1679 with a standard deviation of only 0.3840 by the students. This was an indication that the students rated technology mediated teaching process highly and same with the ICT staff.

The lecturers also agreed that some technologies like computers, internet browsing, use of LCD and other portable electronic devices should be integrated in the teaching and use by the lecturers. The study also found out that support services which are technology enhanced are very critical to distance program as it makes their course more affordable and appealing to those who are working or engaged with other activities.

Portable technologies like mobile phone were found to be popular among the students, lecturers and ICT staff. This could be because they are easily available, affordability and the quality services they offer to the user.

Distance education and online learning offers universities administrators the ability to democratize and decentralize education and offer courses in various geographical settings in a region. The respondents in this study indicated that learning using technologies is good but various measures have to be put in place to ensure that all learners are having available devices so that they are not disadvantaged in one way or the other.

For four persons with disabilities (PWDs) students who were respondents in this study, they indicated that online learning and distance education using various technologies could be suitable for them as it will give them a chance to have individualized learning without much movement and interference, they can assess materials online, interactive with other learners freely and be motivated to learn hence the concept of flexibility was also realized among the PWDs.

The respondents indicated that, distance education and online courses can take care of limited space which is realized at the university, Students using more technology in their learning will not require much physical space hence the university can utilize the available space for other activities like for use by conventional studies or for hire. The other aspect of flexibility of distance education and online learner was the fact that it permits students to study wherever they are despite any disruptions which can occur during the semester sessions. This is because he students are not physically present on campus to be affected by the disruptions.

 Electronic mobile devices like ipads, laptops, and mobile phones among others were the ones the respondents indicated should be sourced more for the distance programme. Both students and lecturers prefer handling academic issues using their mobile devices.

In terms of quality of teaching, the university may benefit greatly or lose out if the level of ICT integration is not given adequate consideration. Students respondents who dot reside in Nairobi indicated that they do not have

ICT infrastructure in the centres where the university has satellite Campuses. The students use internet services to get their reading materials and also do their independent study.

7.0 Discussions

In the students' responses, the most highly rated elements of quality of teaching was the components where technology has been integrated and indicated good results were like administration of term papers, continuous assessment tests and release of examination results, processing of transcripts using ICT and access to information by students wherever they are. This study supports a study carried out by Gakuu (2007) which noted that, as instructors get more familiar with DE, and as their level of experience increases, the rate of adoption is bound to increase.

Quality of teaching received a good mean grade rating. This was an indication that the students rated technology mediated teaching process highly. This concurs with findings by Keller (2005) that technology usage fosters collaborative learning and flexible learning opportunities independent from time and place and that it offers opportunities arising from cross-cultural use.

Various technologies can enhance learning as noted by the lecturers in this study. Mboroki (2007) was in support of this statement when he noted that, the distance education students cited internet as one of the sources they get information from for their academic work. This finding is further supported by other studies like Looi et al.(2009)who noted that seamless learning environment bridges private and public learning spaces where learning happens as both individual and collective efforts and across different contexts such as in-school versus after school, formal versus informal.

Portable technologies like mobile phone were found to be popular among the students, lecturers and academic staff. This could be because they are easily available, affordability and the services they offer to the user. This was supported by findings by Papcharis et al. (2000) were able to report on effectiveness of group learning in a technological environment.

The study also noted the enormous use of Electronic mobile devices like ipads, l aptops, and mobile phones for academic purposes. This is in line to what Gakuu (2007) found that, irrespective of the leaners age or tenure, they are willing to be trained in E-learning. These results also seem to agree with Nor Hapiza et al. (2003) study which concluded that there is a relationship between the level of ICT knowledge and readiness to adopt E-learning.

7.0 Conclusions

In spite of a number of constraints identified, the results showed that the level of preparedness to use technology in higher education at the university level was still low as the infrastructural system was still not well laid for all the students to benefit. This was seen as a major hindrance to the process of having technology mediated distance education and online system. On the overall rating of quality of teaching, and other related services using technology, it was quite good and encouraging to the university. Both the students and lecturers agreed that more technological devices should be used in the teaching and learning process in higher education. This will make education more personalized for the learners and lecturers will also have more chance of interacting with the students and other university staff most of the time when there is need without looking for them in their offices.

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VIRTUAL REFERENCE SERVICE TOOLS AND APPS: FEATURES OF LIBANSWERS AND TAWK.TO

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ABSTRACT
Like any other software type, the Virtual Reference Service (VRS) solutions or applications can be classified as proprietary and free, free being very few meeting the VRS requirements comprehensively. Among the proprietary Software Altarama, Mosio for libraries, LibraryH3lp, LibAnswers etc. are more popular with wider adoption. They all facilitate chat, IM, SMS and web form based communications, with a few offering additional features like professional backup staff and consortia-ready. They intend to provide a complete and integrated reference management system for users support and assistance. Free tools do not over run integrated approach but a library may choose a combination of several free tools or apps for implementing VRS. The paper discusses the features of LibAnswers (paid) and tawk.to as the free VRS tools which may enables the libraries to initiate VRS without any financial implications.
Keywords: Virtual Reference Service (VRS), Digital Reference Service (DRS), LibAnswers, tawk.to

Introduction

Virtual Reference Service (VRS) or Digital Reference Service (DRS) is possible through effective application of ICT for establishing or facilitating communication between the users and reference librarian without any geographical restriction (and time barrier in case of collaborative VRS depending on staff availability in collaborative VRS). ICT infrastructure for providing VRS include as hardware and software, hardware in the present case being standard PC or tablet PC or even mobile phone. Most of the VRS application or solutions are web-based with additional features (in few cases) of downloading and installing the software on standard PC without having any server requirements.

Background of the Study

E-resources play a very crucial role in e-learning as they are available in abundance in both paid and free format. Publishers are offering the libraries the premium subscription based e-resources in the form of e-journals, e-books and online databases. Users also have the freedom of accessing open access content without any financial implication. However, users need guidance and support from the libraries for better utilization of these valuable e-resources along with the print collection. Timely, relevant and accurate assistance from the library not only maximizes the utilization of the library resources but it results in the qualitative and quantitative improvement in teaching-learning and research. Virtual reference service (VRS) can help in achieving this goal. Traditionally, reference service involves in-person desk-based reference but the current electronic era demands 24/7 reference through innovative use of technology. VRS can not only strengthen e-learning but it also impacts distance education positively. While traditional reference mandates users to visit the library physically, VRS can offer online assistance remotely with several value added service as discussed in this paper.

LibAnswers

LibAnswers is an innovative product developed by the vendor Springshare aiming to help libraries engage with their community online and deepen relationships with users. LibAnswers empower librarians to curate relevant resources and share knowledge, provide answers to patron questions, manage and promote library events, spaces, and equipment, analyze the use of library services, and more. LibAnswers is SaaS platform and is used by over over 1,400 libraries in more than 80 countries around the world. LibAnswers offers a searchable knowledge base of frequently-asked questions (FAQ) with built-in facility for asking questions or seeking assistance online without any time and location barrier. It offers LibChat widget, knowledge base, FAQ builder and social media based library communications.

Features:

LibChat for Real-Time Conversations

LibChat is comprehensive chat reference tool with embedding options, and "integrated reference and helpdesk workflows". It is an online chat platform that's built into LibAnswers system. The chat widgets (using our easy widget builder) can be embedded into LibGuides, library website, or other webpages, which patrons can use to chat with library staff. LibChat Widgets are monitored by individual staff, or entire reference section staff could monitor all chats coming from a specific widget.

a.   Reference staff can monitor incoming tickets, SMS messages, and Facebook messages.

b.   Chats can easily be transferred to other online staff members or departments   matching with the right expert to answer their question.

c.   Fellow colleagues can communicate amongst each other internally through chat.
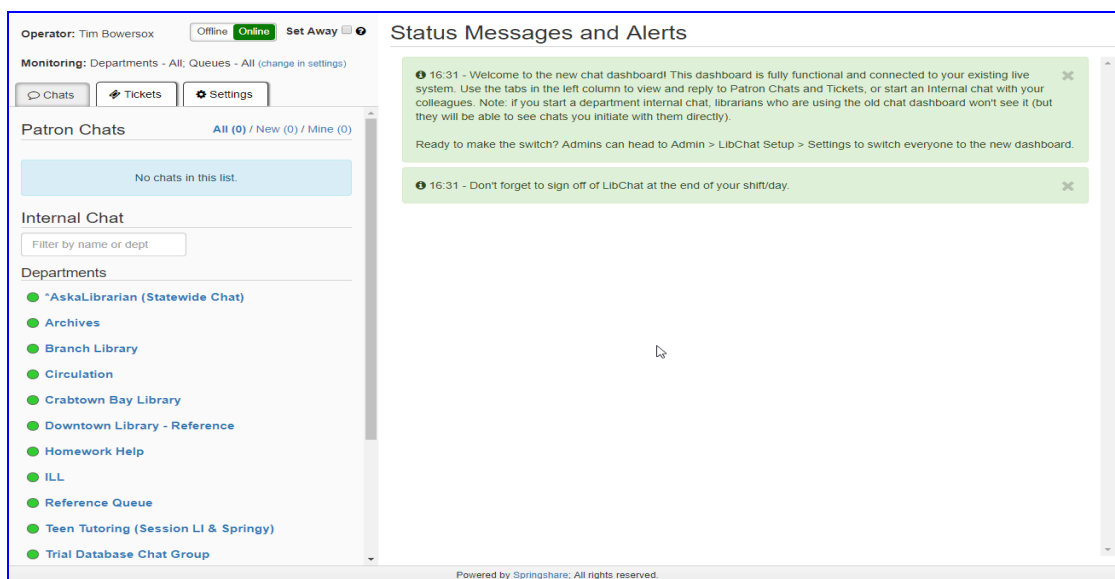
d.   It provides fully customizable skins (look and feel) and embeddable widgets

e.   Chat widget can be embedded in library website page or pop-out widget.

f.   Staff can customized the first interaction presented to the user as soon as he/she joins the chat. First interaction could be simple question "how may I help you today" or a simple greeting.

g.   LibChat gives the user the choice of remaining anonymous or disclose their identity.

Proactive Chat via Pop Up Widgets:

a.   LibChat widget automatically pop on the screen prompting users to interact with the reference staff. Widget pop-up is triggered whenever user stays on a library webpage for certain specified duration.

b.   Built-in customizable-timers and facility for assigning separate for different webpage and/or LibChat-widget

Seamless Conversation Flow:

a.   Chats continues even users shift from one page to other through "Follow me" feature.

b.   Facility of Electronic Document Delivery Service (EDDS) through Chat-widget.

c.   Built-in "We're still working on your question!" to keep the user engaged.

Transcript Management and User Privacy

By default, the chat transcripts are saved automatically or they can be removed as per the VRS policy of the library. LibAnswers facilitates user-anonymization through removal of patron-identifying data from saved transcripts.

a.   Fully-searchable chat transcripts.

b.   Timestamp for each sent and received message.

c.   Privacy controls and data cleansing.

d.   Quality control and ratings included.

Chat Ratings

Patron can comment on and rate the conversation on the basis of the kind of assistance and information they have received from the reference staff. Four-scale rating system is available for the user to rate the chat quality.
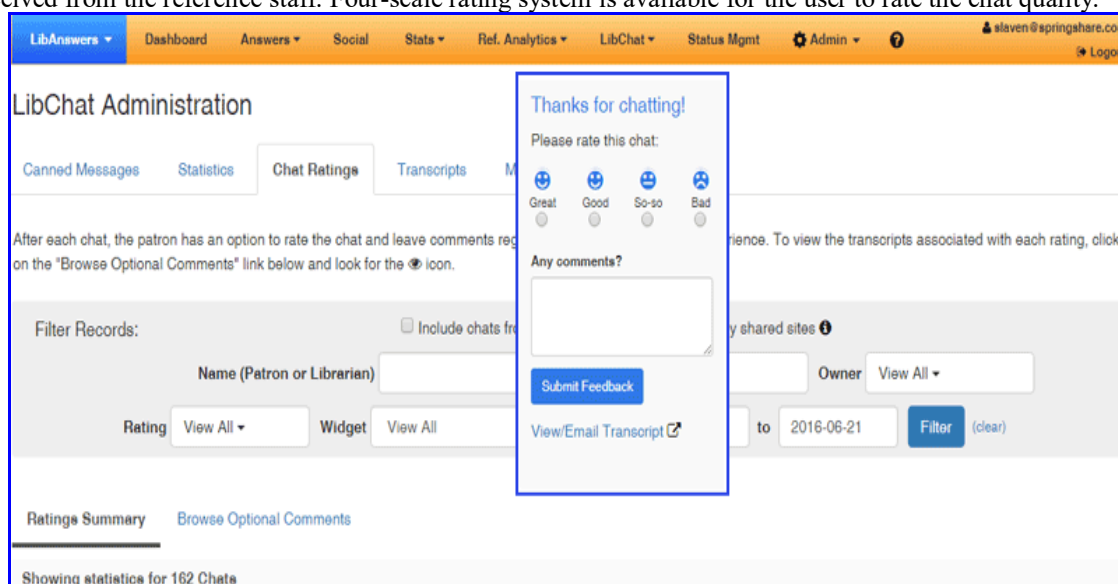
Reference Staff/Transfers
a.   Large volumes of chats can be handled.
b.   Transfer chats to other chat operators.
c.   Chat with colleague or partner staff to collaborate on answers.

Universal Inbox with Ticketing System
No restrictions on number of emails being assignment to LibAnswers enabling user queries to appear/become visible in the LibAnswers dashboard. The email ticketing functionality is fully integrated with the rest of the communication channels.
a.   Email replies with Rich Text Editor
b.   Threaded conversations prevent creation of duplicate tickets.
c.   Ticket tagging and status notifications.
d.   Internal Notes enhance collaboration.
e.   Include links and attachments
f.   Patrons receive highly satisfactory answers quickly through the LibAnswers Ticketing system.

FAQ Builder for Self -Help
Create an online knowledge base of questions and answers that patrons can access 24/7. Within LibAnswers, FAQs are organized in one or more groups. Each group can then be further organized by topic and keyword, which allows patrons to more easily browse and search for the most relevant FAQs. The system enables librarians to build a "community knowledge base portal comprising of FAQs entries (Q/A) containing "videos, rich media, documents, and any relevant and contextual information". This is of immense help to the users as they can search or browse and obtain the relevant answers they need. The FAQ KnowledgeBase is   available 24/7 ensuring patron service when reference staff are offline leading to user-satisfaction.

II.   FAQ Groups:
LibAnswers staff interface will have a default FAQ group, which actually serves as the homepage for entire library system. However, library can create as many groups as needed. This can help in organizing the FAQs by department or service, such as:
a)   General research & reference questions
b)   Citation questions
c)   Tech support questions
d)   Library policy questions
e)   Electronic resources questions & how-to's
Groups access levels can be public or private facilitating an internal staff knowledge base, with FAQs that are only accessible to logged-in staff members. This can really come in handy for things like internal policies, passwords, ready reference resources, etc. Control which staff users can view, edit, and manage FAQs in each

group. This can help in delegating the responsibility for maintaining each group to the appropriate departments or individuals.
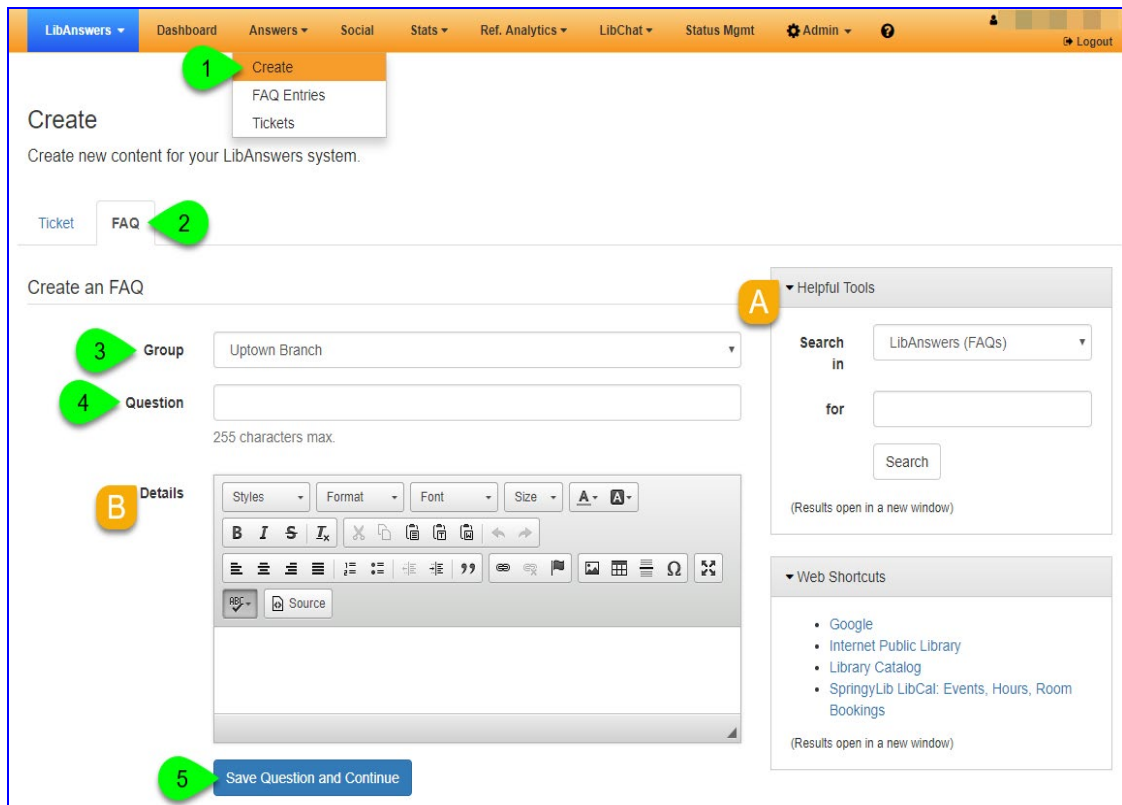
Create and publish an FAQ
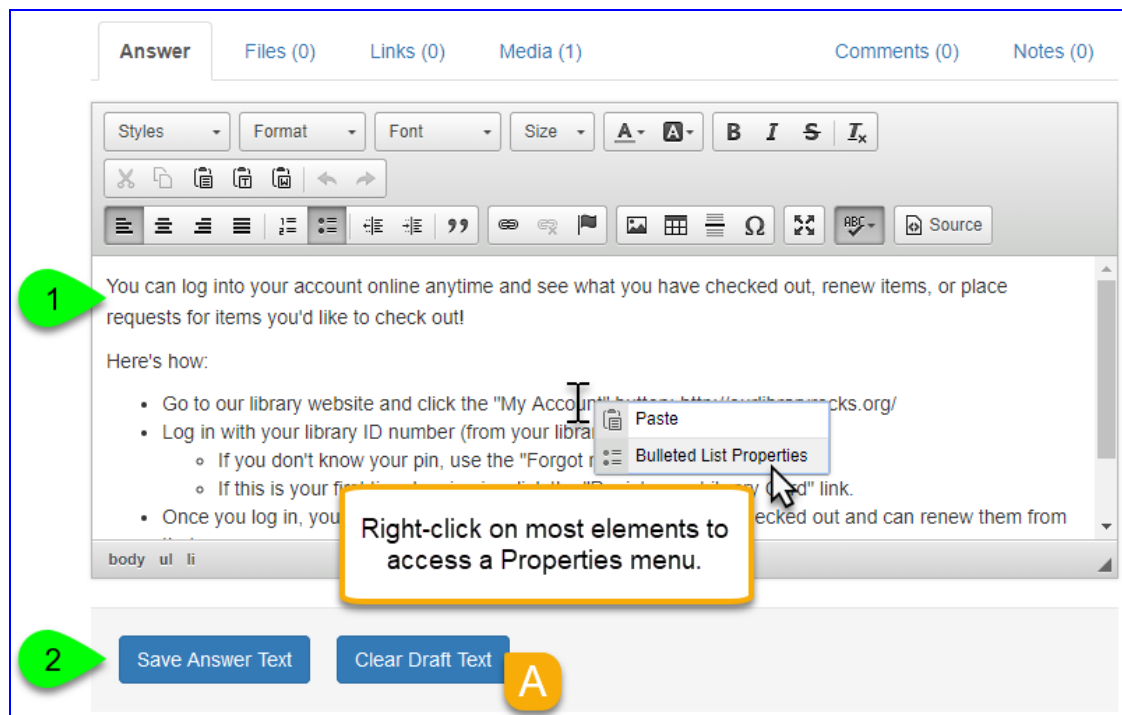
FAQ's answer

Add files, links, and media

Along with the answer text, staff can also add related files, links, and embedded media content (e.g. videos) to the FAQ.
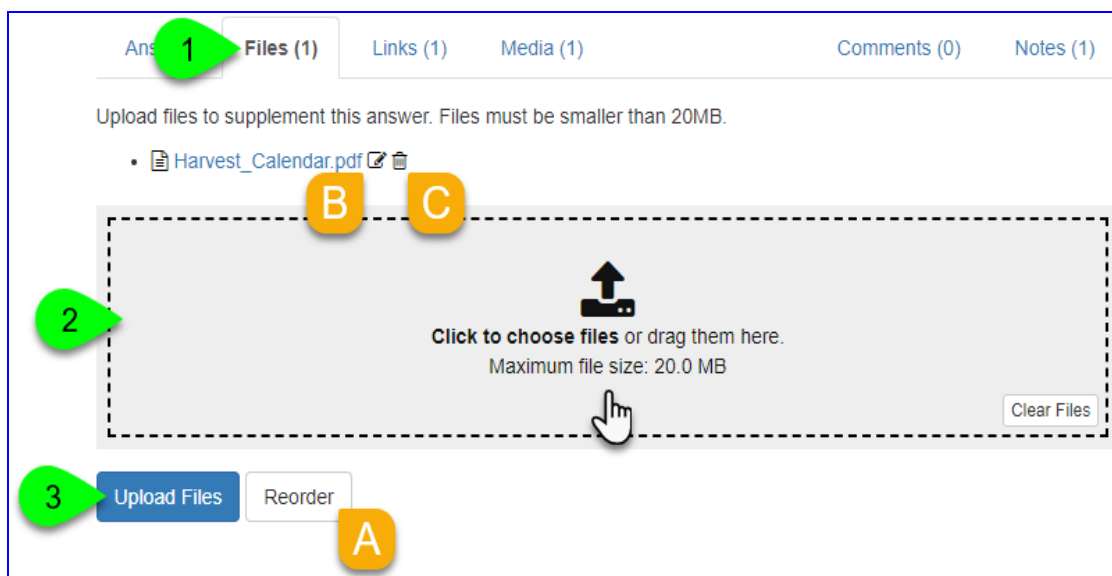
Adding links

Staff can add links to other sites, or even to other FAQs in the LibAnswers groups. Links will display on under the Links & Files section on the FAQ's public page.
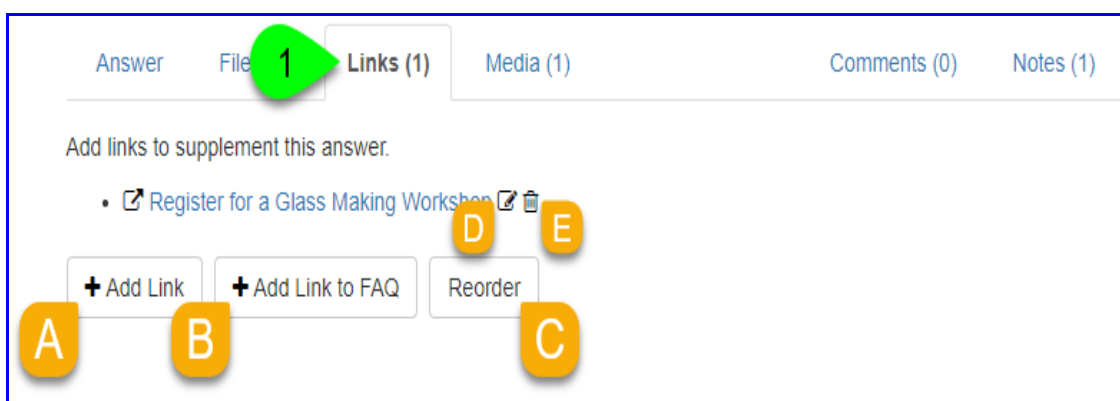
Embedding media

Staff can embed media, such as YouTube or Vimeo videos, directly into FAQ by copy-pasting the HTML embed code provided by the service. Embedded content will display under the Media section on the FAQ's public page.

Facebook and FB Messenger Integration

LibAnswers can be integrated with Facebook and Messenger app so that staff can effectively and efficiently communicate with the users and answer users' questions directly from there. Through FB Messenger, reference

staff can easily reach out to the users for effective communication pertaining to any library or research-related questions.

Pre-scheduling Social Posts

LibAnswers allows scheduling of social posts in advance to actively engage the user communitywith steady stream of library events and activities. This is quite effective when the library is closed during after-service hours and holidays and helps in the promotion of the library services.

Query Spy for Reviewing and Improving FAQ Accuracy

Query-Spy acts as the "Search Query Analyzer" for improving the quality and accuracy of Query-Spy is the LibAnswers' search analysis tool indicating the recall and precision of the retrieved results by the user so as to understand to what extent the user was successful in reaching to the most appropriate FAQ entry satisfying his/her information need. The uniqueness and usefulness of Query-Spy can be ascertained from the fact that it create new and suitable FAQ entries tweaking the existing FAQ KB and ensuring accurate matches in future.

Product-specific Help-Widgets

Staff can help-widgets for various library services and position them at appropriate places. Users can get instant assistance depending upon the service they are currently availing. If they are accessing library OPAC, they can click on the chat-widget dedicated for OPAC related information only. This feature ensures one-click live help at the "point-of-need".

Feedback & Ideas Manager

This LibAnswers functionality enables libraries to obtain user-feedback regarding library products and services. User can submit any "product-enhancement ideas" for later consideration and adoption.

In-Depth Statistics & Reference Analytics

LibAnswers provides a tangible qualitative data about library's communications and reference activity. Engagement Analytics provides information regarding library social media followers, their interests, etc. Statistical reports include:

Real-Time Activity Reports:

Measure Real-Time usage activity reports on everything in the system including FAQ growth over time, hits on FAQs, total tickets for all the reference communication channels, LibChat and SMS stats, and total number of search queries.

Detailed Chat Statistics:

Identify peak-hours with the daily/weekly/monthly trends. LibAnswers generates report on user web-browser, operating system information and additionally mobile analysis.

Reference Analytics

Detailed reference report on all reference transactions (online or in person).

Integrated READ Scale

LibAnswers provides qualitative assessment of reference quality with the help of READ scale fully integrated into Reference Analytics. It provides the "READ score" on a 6-point scale for every reference transaction.[1] The metrics is used by the library for the improvement and enhancement of the VRS quality.

Social Media Activity Statistics

Measure & report on library's social media activity in all channels. Run aggregate statistics or drill down to individual channel engagement statistics.

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[1] READ Scale (Reference Effort Assessment Data) was developed by Dr. Bella Karr Gerlich at Carnegie Mellon University. It is a 6-point scale tool providing qualitative statistics regarding skills, knowledge, techniques and tools utilized by the librarian during a reference transaction.

FAQ Access Statistics

This include detailed statistics on FAQ pages, including users' comments and rating. Query-Spy reports helps in identifying the gaps in the content and creating new FAQs.

Integration Other Springshare Products

Effective integration of LibAnswers with other Springshare tools makes it a powerful platform. Such integration include FAQ KB with LibGuides, Embed LibChat widgets inside LibGuides, etc.
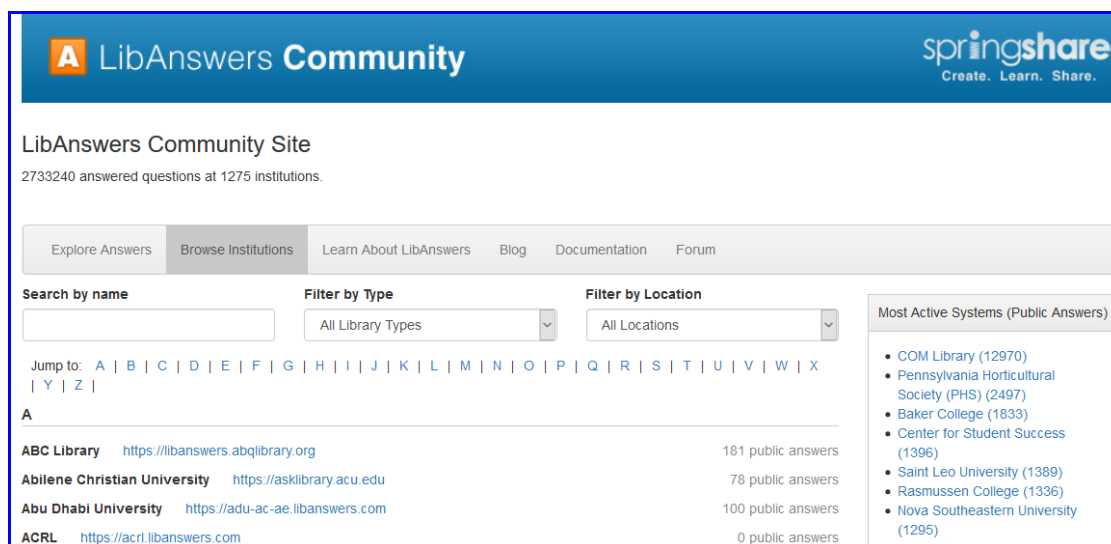
Social Media Management & Engagement

a.   Fully Integrated Communication Workflows: Unify all library communication channels into one platform. Integrate social media with reference and outreach services and make it part of library communication workflows.

b.   All Social Activity in One Place: Activity from Twitter, Facebook, and Pinterest in one place enables staff to efficiently monitor and engage all social channels at once.

c.   Respond/Post to Any Social Channel: It's as easy as answering a ticket or a question in LibAnswers - all point-and-click operations.

d.   Filter and Organize Channel Activity: Apply Filters across any social channels for effective monitoring of social channels.

e.   Become Social Media Experts: LibAnswers enables librarians of any skill level to use the social media channels to their full advantage. Our easy-to-use and easy-to-understand social media functionality guides library through everything it need to know to master the social media strategy.

f.   SMS / Twitter / Facebook Alerts in LibChat: These new message alerts had been displayed in the Tickets tab since, well, they're technically tickets. These are all near-instantaneous interactions, much like chats. Users expect faster replies via these channels, and appreciate getting them. Now that these interactions have moved over to the Chats tab offering more streamlined workflow.

Screenshare:

LibChat enables libraries to provide online support to their patrons with answers, info, and links in real time, with built-in options for following up after each chat session. However, with certain types of research or technical support questions, it can be incredibly helpful if both the staff operator and patron user are able to look at the same screen. Not only can this help staff better understand the patron's question or problem, but it also allows staff to better demonstrate how to find the answer or resolve the issue. It allows the reference staff to start 2-way screensharing sessions during any chat. Either the operator or the patron can share their screen with the other person. Features includes:
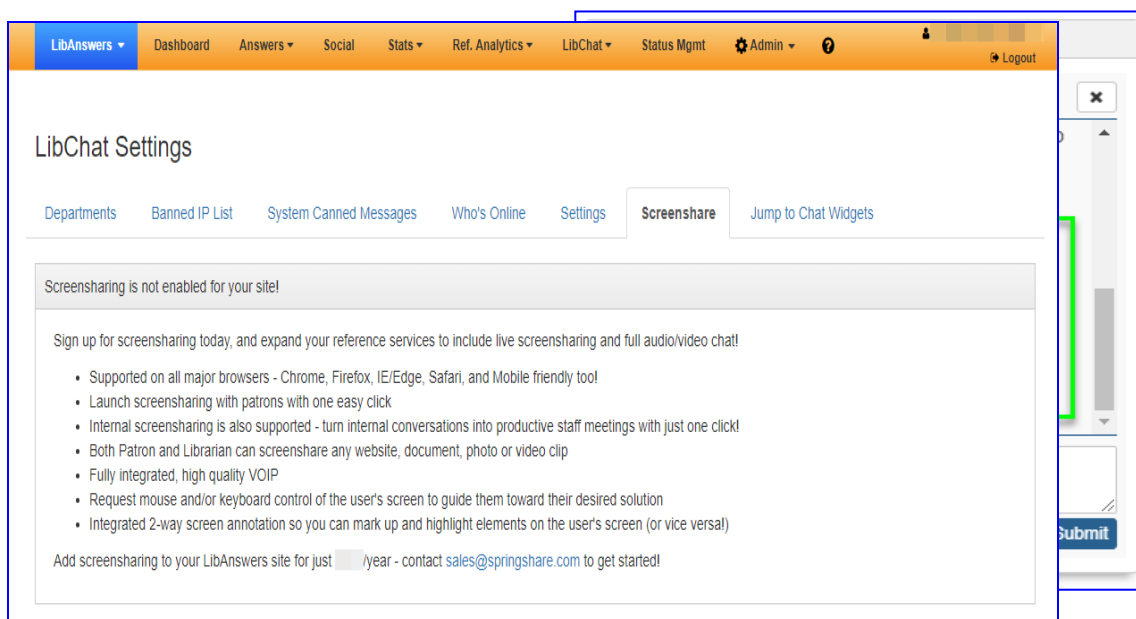
How to start a screensharing session

1.   While chatting with a patron, department, or operator, click on the **Request Screenshare** button in the operator chat window.
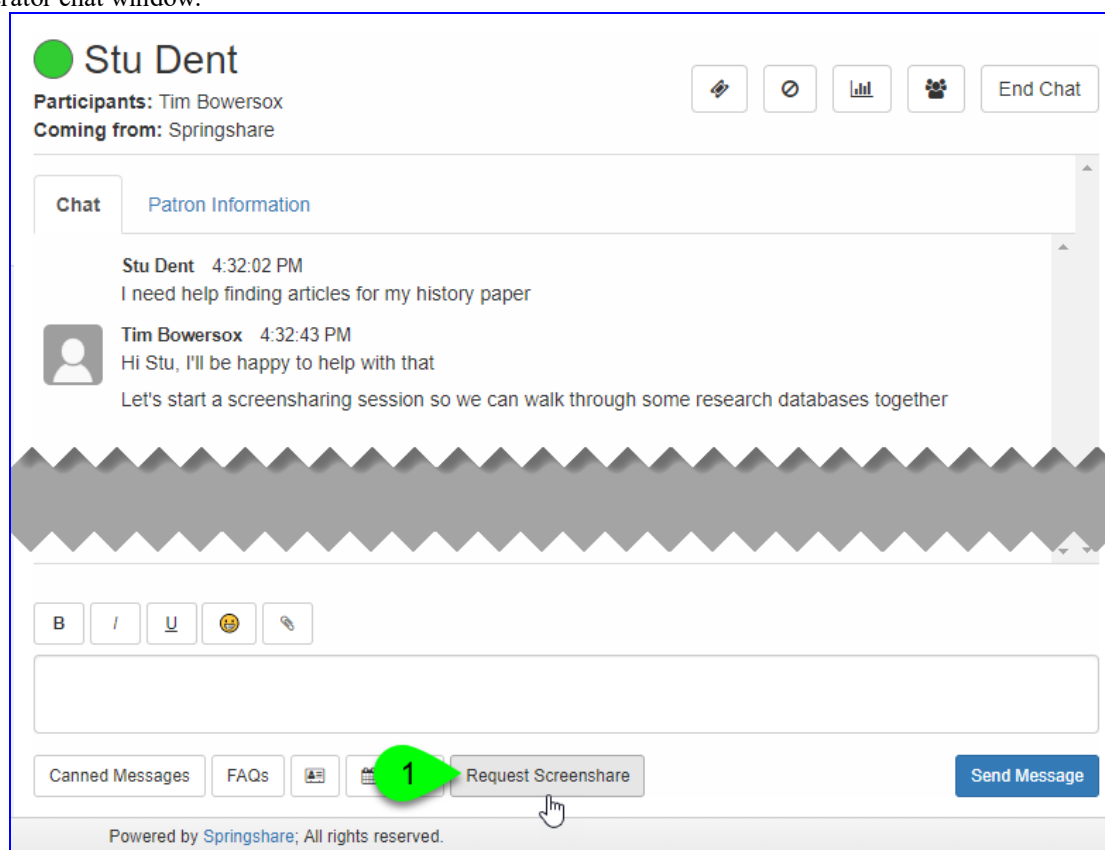
2.   In the chat widget, the patron will receive a message containing a **Join the Screensharing Session** link. When they click this link, they will be able to join the session.

3.   In the chat history, staff will see a **System** message appear, which includes a button for starting the screensharing session as the host. Click that green **Launch** button to begin the session as a host.

QuestionPoint (OCLC) Acquisition by LibAnswers (Springshare)

OCLC has entered into an agreement to sell the "QuestionPoint 24/7 Reference Cooperative" and active QuestionPoint (QP) subscriptions to Springshare, provider of the LibAnswers Platform. OCLC has commenced the transfer of QuestionPoint 24/7 Reference Cooperative, subscriptions to LibAnswers. This was announced on 31st May 2019. QP will extend LibAnswers virtual reference software to include the comprehensive "QuestionPoint 24/7 Reference Cooperative" and all present QuestionPoint subscriptions to Springshare. QuestionPoint's team of reference librarians will become part of Springshare and will continue to work from their current locations around the world. This acquisition is expected to ensure these users access to high-quality assistance from professional librarians, anytime, anywhere. Springshare has committed to further invest in enhancing the Cooperative by hiring more co-op librarian staffers to shorten the patron wait times, providing additional training to the co-op librarians, and devising more effective workflows to share knowledge and information to be better informed about local library content and local information. The best of both is aiming to provide member libraries with the best possible virtual reference tools to meet users'needs through the full-featured, state-of-the-art reference software and unparalleled professional reference service .

Current QuestionPoint subscribers will maintain uninterrupted use of QuestionPoint prior to software upgrades/transition and service migration. QuestionPoint subscribers can request a LibAnswers Platform system to learn and interact with the system and can attend free and unlimited training to learn the LibAnswers Platform. Springshare will modify its LibAnswers software to include functionality required to support all QuestionPoint subscribers. Springshare anticipates completing this project by June/July 2019. All QuestionPoint customers will move to LibAnswers by year-end.

Free Software/Web tool: Tawk.to

Tawk.to is an easy, fast and reliable live chat support and messaging application focusing on effective and useful communication bridging the communication gap between organizations and their patrons. The platform allows to reach users directly from the website, mobile app, or from a customized page. Setting up takes only a minute, so that library can immediately add their patrons. Apart from its live chat reference service, tawk.to offers a bundle of other features that allow online visitors to have a personalized assistance. It is a free live chat app to deliver personalized and real time reference service and be available at the time of user requirement.

Patrons can initiate a chat from library website or tawk.to mobile apps while librarians can answer questions from the dashboard or app. tawk.to is easy to setup, free forever and secure web-based platform to message library users instantly.

Features:

Success of a library depends on the quality of the information products and services they provide and their efficiency in satisfying the information needs of their users. Communication plays a vital role in user acceptance and satisfaction towards library services and libraries do not miss any opportunity to utilize every possible communication available linking the library and the users. Tawk.to helps libraries achieving this goal by proving a platform for professional virtual reference service to assist the library users in fulfilling their information needs meeting their information seeking behaviour (ISB). Libraries can make it completely coherent to their mission and objectives by allowing active user engagement with full attention during chats. Tawk.to is compatible with collaborative model of VRS thus facilitating the depth, reach and quality of VRS with automated triggers, and canned shortcuts. It facilitates monitoring visitor traffic and attending multiple visitors at a time even when library don't has that many staff active. Collaborative partners can easily join on live chats to make sure that patrons are given the timely help they need. Tawk.to provides multilingual UI (user interface) available in 100+ languages and works seamlessly with Android, iOS, Windows and MacOS so libraries/professionals can have the option to use any of the available smart devices.

Table: Features of tawk.to

SN	Feature	Description
1.	Pre-chat form	setup Pre-chat form to ask required contact details of the visitor.
2.	Predefined Shortcuts (canned responses)	Shortcuts are the predefined massages coded for answering frequently asked questions (FAQs) by simply typing "/" followed by a keyword to respond quickly and readily to patron' queries. Staff can create and respond quickly with predefined shortcuts. For example typing /hello quickly sends the visitor the text: "Hello how can we help you today?". Specific URLS can also be added to direct the user to a specific e-resource or database. Shortcuts can be used both in a live chat, and when replying to a ticket. ■ Staff can create/Add new shortcuts and use it for answering commonly asked questions by simply typing "/" followed by a keyword. For example- type /t to quickly send the visitor the text: "Thank you for contacting. Wish you all the very best." ■ Edit existing ones ■ Searching in existing shortcuts ■ Import from CSV.
3.	Setup and Manage Departments	In case of collaborative/cooperative VRS may be functional in university library system or in a consortium environment, number of departments/subject/institution specific department can be created. User will have the freedom to select any of them as per their information need.
4.	Concurrent chats	Staff can answer as many concurrent chats as they can manage. There are no limits.
5.	Knowledge Base (KB)	Internal Knowledge Base (KB) for quick reference by staff without leaving the conversation. KB allows to build rich and comprehensive custom content with categorization accessible instantly by staff for dealing with the online users. This helps in improving user satisfaction and reducing support requests.
6.	Staff to Staff Chat	Staff to Staff Chat (direct message) with the option to add additional librarians to the chat for a group discussion directly in the dashboard or via our mobile apps without leaving the application.
7.	Powerful Ticketing System	A Ticket is a communication thread between a user and a library staff. Tickets store emails, chat conversations, internal notes, or other data related to a single user issue at one place. If a query can't be resolved in one conversation, it can be converted into a ticket to deal with it later. Tawk.to built-in live chat along with a fully-fledged, multi-site ticketing system.
8.	Track User Satisfaction	Every time a staff answer a chat, a visitor has the option to like or dislike the conversation, and each of those events are recorded in the Reporting section. This goes a long way to determine how users feel about the online

		support and assistance offered by the library. Users have the option to give their feedback in the scale ranging from Negative, Neutral or Positive. The report thus generated can be filtered by Date Range, Librarians, Department and even Tags to narrow down exactly where the problems are that need to be solved.
9.	Chat history	Chat history is kept forever until deleted.
10.	Track Progress	■ Monitor and track VRS (individual or collaborative) progress over a period of time. ■ Chat history ■ Performance monitoring via Analytics function.
11.	Scalable	■ There are no limits to the number of librarians that can be added for providing VRS. ■ Each librarian can have own account linked to unlimited sites so they could communicate with online visitors without any limitations.
12.	Control chat provenance with Domain Restriction	By default, a chat widget code will work on all the domains where it has been inserted - this is great for flexibility of simply adding the widget to all of your websites, however sometimes (often for security purposes) you may want to ensure the chats can only be initiated from a specific URL or site.
13.	Ban list	■ Particular IP address can be blocked ■ Reason for blocking or banning can be recorded.
14.	Data Security & Privacy	■ Staff-user communication: 128 bit Secure Socket Layer (SSL) ■ Data hosting: Encrypted servers for data safety. ■ Privacy Settings: Visitor IP Tracking - Off/On
15.	Subscription Cost	Nil. Zero subscription cost for both desktop and mobile app.
16.	Ads support	tawk.to interfaces (both librarian's and users') don't have any ads as well as no spam.
17.	Mobile App	tawk.to mobile apps (both Android and iOS) enables answering chats or reply to tickets from staff mobile device to offer fast and personal service even if staff are not at the reference desk (on the go). Features of the mobile app: ■ receive push-notifications about new visitors on library website, new chat requests and new messages from visitors or librarian colleagues; ■ monitor visitors movement on your websites and initiating chat with them; ■ invite librarians into tawk.to, speak with them in direct messages or group chats; ■ work with existing tickets or create new tickets right in the app; ■ view chat history, convert them into tickets, copy or send chats transcript via email. ■ Updated regularly ■ More than 100,000+ installs

1.	**Forthcoming features**	**Translation** Automatically translate chats in real time. **In-Chat Payments** Accept payments from visitors right in the chat window which can be used to receive library membership fee, fine and other relevant payments. **SMS Integration** Select a local number, and send and receive text-messaging from the dashboard.
2.	**Paid Features**	**Remove tawk.to branding** With the Remove Branding add-on libraries can customize their visitor experience to suit their USP. This add-on helps to: • Remove/Customize widget-branding . • Remove/Customize branding in email-tickets and chat

		transcripts.
		• Custom support-email.
		Screen Sharing, Voice Calls and group Video Chat
		Staff can share a link to invite 3 participants instantly on all browsers like Chrome, Opera, Firefox, Edge or Safari and on on tawk.to mobile apps.
		■ Speak with up to 3 people at at time.
		■ 2-way screen sharing with 1 click.
		■ Works on Mobile Devices.
		■ Private, Secure & Reliable.
		■ Nothing to install.

Tawk.to is a free innovative, cutting-edge, versatile online communication tool suitable for implementing VRS in any type of libraries.

Conclusion

It would not be an over statement to say that we are living in an era of social media with people relying heavily on it for communication. In a library setup, any particular social media service can not be used for providing VRS as libraries are dealing with a heterogeneous group with diverse social media preferences. Social media based communication poses the problem of security and lack of control. Moreover, social media platform do not provide the features and facility as available with the dedicated VRS tools and platforms.

While, any commercial may be adopted by the library, it is recommended that library may take the three months (90 days) free trial of the proprietary S/W, LibraryH3lp for familiarity and user response. Library having financial limitations/restrictions are recommended to try twak.to with a combination of free screen sharing software (if desired) for providing VRS to their users community free of cost. Whatever may be the case, free or proprietary, libraries must adopt & adhere to VRS guidelines for successful and sustainable VRS.

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WORK STRESS, WORK ENGAGEMENT AND SERVICE DELIVERY WITHIN A CHANGING DISTANCE- LEARNING ENVIRONMENT IN ZIMBABWE

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ABSTRACT

This research was conducted from the perspective of a positive human behaviour paradigm in the context of human resource management. It investigated the interrelationships between work stress, work engagement and service delivery of academics in a changing distance-learning environment in Zimbabwe, for which there is a paucity of research. A descriptive, cross-sectional survey design was applied to a sample of 83 academics. Another sample of 101 students was included to consider their perception of service delivery by academics. Confirmatory and exploratory analysis revealed a four-construct measurement model for work stress, a three-construct model for work engagement and a four-construct model for service delivery. Correlational analysis and structural equation modelling revealed significant relationships between these constructs. Tests for significant differences among different groups based on socio-demographic variables were revealed. The *t*-test did not reveal significant differences in service delivery perceptions between academics and students. This study should bring new knowledge to managers at distance- learning universities by improving their understanding of how academics are affected by increasing, new job demands and workloads. Provision of adequate resources at both individual and organisational levels should be prioritised in order to minimise work stress and improve work engagement, and subsequently service delivery.

Keywords

Academics, changing learning environment, e-learning, human resource management, open and distance learning, work engagement, work stress, service delivery.

BACKGROUND

Open distance learning (ODL) has gone through a lot of transformation since the 19th century (Caruth & Caruth, 2013). This transition has brought additional roles to academics and that is increasing their workload (Englund, Olofsson & Price, 2017). This increasing workload in turn, seems to be causing increased work stress and even work engagement problems within ODL academics (Gregory & Lodge, 2015; John, Kenny & Fluck, 2014). These negative work outcomes seem to be contributing to less than desirable levels of service delivery within a number of universities. This may be a result of academics having to do a lot of work under pressure, which reduces their efficiency and effectiveness.

Whilst demand for higher education is on the increase in Africa, only about 6% of Africans have access to ODL compared to the world average of about 26% (Kokutsi, 2011). The low uptake is largely attributable to major constraints of ODL, which include the shortage of computers, lack of internet access, that is exacerbated by low internet bandwidth and skills shortages. However, in Africa, ODL is transforming at what seems to be growing workloads of academics. A study conducted in South Africa, revealed that 34% of academics contemplated resigning from their work because of increased workloads causing burnout and job dissatisfaction (Theron, Barkhuizen & Du Plessis, 2013). In addition, academics become work disengaged (Poalses & Bezuidenhout, 2018).

The Zimbabwean higher education sector is changing drastically, especially over the past decade (Nyenya & Bukaliya, 2015). The number of universities has risen from about seven in 2007 to 13 as of 2016 and in 2019 is likely to reach 22 (Ministry of Higher and Tertiary Education, Science and Technology Development, 2018). In Zimbabwe, the ODL challenges are becoming more complex since the new crop of students are relatively younger and unemployed (Musingafi, Mapuranga, Chiwanza & Zebron, 2015). Such students have unique needs, attitudes, expectations and morals. The ODL academic has to embrace two categories of students simultaneously, that is, the young and immature school leaver and the more mature usually employed adult student. The two have different attributes and expectations and that makes the process of knowledge facilitation complicated (Heydenrych & Prinsloo, 2010).

Despite Zimbabwe facing economic challenges that have culminated in the shortage of learning resources, she was rated the most literate nation in Africa (Rosenthal, 2013). This poor economic performance of the

government and a lack of sufficient resources at its state universities, are affecting the education delivery system negatively (Majoni, 2014, Uzhenyu, 2017). As a result, government support has decreased and the provision of research grants and students' loans have dwindled since the dollarisation of the economy in 2009 (Chitora, 2010; Zulu, 2015). The Zimbabwean government declared in May 2015, that it planned to wean state universities from public funding (Zulu, 2015). This change in the funding system will include staff salaries. This, in turn, is likely to affect staff motivation and their jobs security as well as work engagement and service delivery (Ngokwana, 2015). When the context of the study is considered, ZOU is the only state university providing ODL in Zimbabwe since becoming a fully-fledged university in 2000 (ZOU, 2016). In the past, ZOU has largely been using the hard copy (printed) module as the dominant delivery mode, complimented by six hours of classroom tutorials for each course in a semester. ZOU is now in the transition stage of slowly moving away from the printed mode of delivery, towards an e-learning delivery mode, in line with international best practices (Hovenga & Bricknell, 2006) and globalisation. As a result, ZOU's interim plans to combine the contact classes delivery mode and e-learning are now at an advanced stage. This change should contribute to the changing roles and potential increased workload for the academics. The increased workload comes from the slow transition phase from the contact classes' delivery mode to e-learning as academics have to use both modes possibly for a very long time. Increases in workload affect work engagement and cause work stress (Di Biase, 2000; Rennie & Morrison, 2013). It appears as if there were no plans at ZOU to increase the number of academics (ZOU, 2015a). This may most likely have an adverse effect on work engagement and work stress of the ZOU academics. This may in turn adversely affect service delivery to ODL learners (Barkhuizen, Rothmann & Vijver, 2014; Fernet, Austin & Vallerand, 2012; Stedman & Coaldrake, 1999).

The transformation phase in ODL of moving from the traditional modes of delivery of using both the printed modules and contact classes (Phase I and II) to virtual learning (Phase III and IV) at the ZOU (ZOU, 2008), has introduced many changes to the work roles of academics. This transformation has culminated in increased workload as academics have to use both modes of delivery and this is making their jobs more complicated and time consuming. The correspondence mode is taking long to be phased out as minimal progress has been made on e-learning. E-learning is supposed to make ZOU more competitive and to move in tandem with a lot of other ODL universities which have become a force to reckon with. That transition period at ZOU has taken longer than expected, as progress has been very slow, due to what appears to be a shortage of resources (Ndudzo, 2012; Vutete & Uzhenyu, 2016). A lack of adequate preparation for this change in the mode of delivery has been observed according to the evaluation report of ZOU's strategic plan (ZOU, 2014). There has not been much proactive training and development of academics for the online environment (communicating and marking assignments on-line). Training opportunities have been delivered mostly to full time academics, yet the full time/part time ratio is 1:3.

A sizeable number of ZOU students live in rural areas (ZOU, 2014). It is also known that the majority of those living in the rural areas do not have access to Internet facilities (Zimbabwe National Statistics Agency (ZNSA), 2013). Ironically, these same students are expected to move towards an e-learning mode of delivery. There has not been much acquisition of adequate computers at the ZOU for both staff and students. In addition, there is also a shortage of computer laboratories and even appropriate software to have fully fledged virtual learning (e-learning facilities). This also confirms that job resources are scarce, showing a very real contextual problem that is putting additional strain on the academics.

It is this transition period where both modes of delivery are being used (class contact and e-learning) which is taking very long at ZOU, due to a perceived lack of resources. This is increasing the academics workload. This is likely to lead to increased work stress levels and decreased work engagement in academics (Gregory & Lodge, 2015; John et al., 2014).

PROBLEM STATEMENT
The problem statement pertaining to this study is:
What is the impact of academic work stress and work engagement on service delivery in an ever-changing distance learning environment in Zimbabwe?

PURPOSE OF THE RESEARCH
This research aimed to shed more light on the effect of the ever-increasing work roles of ODL academics because of emerging trends in ODL modes of delivery. These changes are largely brought by significant developments in Information Technology (Abdullah, 2015; Berge, 2008). This study therefore aimed to contribute to the body of knowledge in the discipline of Human resource management on areas covering the changing work roles, workloads, experience of stress and work engagement experienced particularly by ODL academics. Furthermore, the study aimed to bring new insights on how the changing roles of academics affect or

impact on service delivery to students, especially on the quality of tuition they receive. There was need for this study to clearly link the effect of changing academic roles, which culminate in increased workload on work stress and work engagement, and how these affect academics performance as evidenced by the level of service delivery in ODL. The body of such knowledge on these relationships should be able to help human resource practitioners and senior management in ODL universities to come up with strategies that effectively prepare the ODL academics to adjust effectively to these emerging roles in their work.

Despite previous studies, no integrated research explains the relationship dynamics between work stress, work engagement and service delivery mainly in an ODL University. It was against this background that this research intended to study the relationships between these constructs in the changing Zimbabwean distance-learning environment.

RESEARCH AIMS (OBJECTIVES) AND HYPOTHESES
In terms of the empirical study, the specific aims and the respective hypotheses were:

Research aim 1
To determine the interrelationships between work stress, work engagement and quality of service delivery in ODL.
Sub-aim 1.1

To determine the relationship between work stress and service delivery in ODL academics.

$H_{o1.1}$ There is no statistically significant relationship between work stress and service delivery in ODL academics.

$H_{a1.1}$ There is a statistically significant relationship between work stress and service delivery in ODL academics.

Sub-aim 1.2

To determine the relationship between work engagement and service delivery in ODL academics.

$H_{o1.2}$ There is no statistically significant relationship between work engagement and service delivery in ODL academics.

$H_{a1.2}$ There is a statistically significant relationship between work engagement and service delivery in ODL academics.

Sub-aim 1.3

To determine the relationship between work stress and work engagement in ODL academics.

$H_{o1.3}$ There is no statistically significant relationship between work stress and work engagement in ODL academics.

$H_{a1.3}$ There is a statistical significant relationship between work stress and work engagement in ODL academics.

Research aim 2
To determine if work stress, work engagement and service delivery in the ODL context differ for respective socio-demographic groups (*based on age, gender, educational qualification, job title, administrative position, work experience, employment status and years of learning*).

$H_{o2.1}$ There is no statistically significant difference on the relationship between different ages of academics and work stress, work engagement and service delivery in an ODL system.

$H_{a2.1}$ There is statistically significant difference on the relationship between different ages of academics and work stress, work engagement and service delivery in an ODL system.

$H_{o2.2}$ There is no statistically significant difference on the relationship between different gender of academics and work stress, work engagement and service delivery in an ODL system.

$H_{a2.2}$ There is statistically significant difference on the relationship between different gender of academics and work stress, work engagement and service delivery in an ODL system.

$H_{o2.3}$ There is no statistically significant difference on the relationship between different educational qualifications of academics and work stress, work engagement and service delivery in an ODL system.

$H_{a2.3}$ There is statistically significant difference on the relationship between different educational qualifications of academics and work stress, work engagement and service delivery in an ODL system.

$H_{o2.4}$ There is no statistically significant difference on the relationship between different job titles of academics and work stress, work engagement and service delivery in an ODL system.

$H_{a2.4}$ There is statistically significant difference on the relationship between different job titles of academics and work stress, work engagement and service delivery in an ODL system.

$H_{o2.5}$ There is no statistically significant difference on the relationship between different administrative positions of academics and work stress, work engagement and service delivery in an ODL system.

$H_{a2.5}$ There is statistically significant difference on the relationship between different administrative positions of academics and work stress, work engagement and service delivery in an ODL system.

$H_{o2.6}$ There is no statistically significant difference on the relationship between different work experiences of academics and work stress, work engagement and service delivery in an ODL system.

$H_{a2.6}$ There is statistically significant difference on the relationship between different work experiences of academics and work stress, work engagement and service delivery in an ODL system.

$H_{o2.7}$ There is no statistically significant difference on the relationship between difference in employment status of academics and work stress, work engagement and service delivery in an ODL system.

$H_{a2.7}$ There is statistically significant difference on the relationship between difference in employment status of academics and work stress, work engagement and service delivery in an ODL system.

$H_{o2.8}$ There is no statistically significant difference on the relationship between different ages of students and service delivery in an ODL system.

$H_{a2.8}$ There is statistically significant difference on the relationship between different ages of students and service delivery in an ODL system.

$H_{o2.9}$ There is no statistically significant difference on the relationship between different gender of students and service delivery in an ODL system.

$H_{a2.9}$ There is statistically significant difference on the relationship between different gender of students and service delivery in an ODL system.

$H_{o2.10}$ There is no statistically significant difference on the relationship between different number of years of learning of students and service delivery in an ODL system.

$H_{a2.10}$ There is statistically significant difference on the relationship between different number of years of learning of students and service delivery in an ODL system.

Research aim 3
To determine if academics and students have different perceptions on service delivery in ODL.

H_{o3} There is no statistically significant differences on service delivery perceptions between academics and students in an ODL system.

H_{a3} There is statistically significant differences on service delivery perceptions between academics and students in an ODL system.

Research aim 4
To determine if academics' work stress, work engagement and service delivery have a good fit with the data.

H_{o4} The empirical relationship dynamics among the variables do not have a good fit with the theoretical model.

H_{a4} The empirical relationship dynamics among the variables have a good fit with the theoretical model.

SIGNIFICANCE OF THE STUDY
This study should be very useful for the theoretical, empirical and practical levels.

Contribution on a theoretical level
This research might lead to better understanding of the constructs of work stress (represented by overload, job insecurity, organisational support, relationships, growth and advancement) and work engagement (represented

by vigour, dedication and absorption) of ODL academics on service delivery (represented by reliability, assurance, tangibles, empathy and responsiveness) provided by higher education distance learning universities. If significant relationships were established, more awareness on how work stress of academics could be managed and how academics work engagement could be enhanced. This could improve service delivery in distance learning universities.   Such relationships if established, other researchers could explore possible interventions that would make ODL universities more competitive, as well as, creating a conducive working tempo for academics. Furthermore, the findings were likely to contribute to the body of knowledge concerned with the salient issues that affect the academic's work performance and contributing to poor service delivery that needed to be addressed.

Contribution on an empirical level

In this case, the results from the actual study might provide useful insight into the empirical interrelationships found between any two of the three constructs (work stress, work engagement and service delivery) as well as between all three. Furthermore, the study would prove whether significant differences exist between groups of academics based on demographical variables namely age, gender, marital status, faculty, job level, educational level, race, administrative position, years of employment and employment status. Should significant relationships be found, then the results should be helpful to ODL institutions particularly senior management and the human resources departments of how the three constructs and demographical variables play a key role in the psychological functioning, as well as, the well-being of the academic.

Contribution on a practical level

On a practical level, the research could establish whether ODL academics are adapting to the changing roles emanating from the transformation taking place in distance learning environment.   This would identify if the ODL academics have attained the requisite skills and exposure to effectively execute their roles in order to improve service delivery. The ODL institutions should be able to assess whether they are doing enough to make the academics' work environment conducive to enhance motivation and job satisfaction. This study should bring new knowledge (epistemology) to senior managers at the ZOU by improving their understanding of how academics are affected by the increasing new job demands, which in turn increase their workload. The increased workload was being executed with inadequate resources. This study should bring to senior management's attention that this scenario is stressful and causes work disengagement. This in turn, adversely affects the academics' work performance and subsequently, service delivery in the institution. In summary, an improved understanding of these demanding changes of the academic work roles in ODL should assist human resources practitioners even in other ODL institutions, to redesign the academic job roles accordingly. In the case of the ZOU, such knowledge would influence policy makers in the parent Ministry of Higher and Tertiary Education, Science and Technology Development and even rescind their intended decision to wean state universities from government funding (Uzhenyu, 2017; Zulu, 2015). Instead, they should embark on job redesign for the academics' roles through rationalised job descriptions. That should enhance service delivery by improving the quality of learning and teaching in an ODL institution.

LITERATURE REVIEW

Work stress

Work stress is a dynamic condition in which an employee is faced with an uncertain but important outcome, which affects his behaviour and well-being (Jubenkanda, 2010, p.152). Work stress can cause harmful physical and emotional responses in the event that work demands do not match the capabilities, resources or needs of the worker (Jubenkanda, 2010; National Institute for Occupational Safety and Health (NIOSH), 2014). Work stress arises from harmful physical and emotional responses due to conflict between job demands on the worker and the degree of control, which the employee has in order to meet these demands (Bakusic, Schaufeli, Claes & Godderis, 2017).

It is generally associated with several vital individual physiological, psychological, and behavioural symptoms (Mahembe & Muromo, 2010). A condition that is stressful exists when there is doubt regarding the outcome that can be favourable or unfavourable (Luthans & Youssef, 2007; Robbins, 2010). The individual would be faced with an opportunity, limitation or demand that is related to desired outcome(s), which is perceived as uncertain and important (Ganster & Perrewe, 2011; Robbins, 2003). Stress is at its highest for individuals with a greater chance of losing and lowest for those likely to win or achieve (NIOSH, 2014). Work stress can be more pronounced and damaging if resources become scarce, as opposed to being adequate (International Labour Office (ILO), 2016).

Table 1
Environment factors that cause work stress (Robbins & Judge, 2012)

Environment	Description
Political	Uncertainty arising from transition of power, new policies, restructuring of government
Economic	Underperformance of economy causing high inflation, unemployment, currency depreciation
Technological	Emerging roles due to new mode of learning, new communication techniques, new assessment techniques

Table 2
Organisational factors which cause work stress (Robbins & Judge, 2012; De Jonge&Dormann, 2017; Saufi, Leong, Chua &Eranza, 2017).

Organisational factor	Description
Physical	Noise, shortage of office space, poor ventilation, poor lighting and unsafe working environment
Structure	Too much formalisation, bureaucratic tendencies and unclear lines of communication
Motivation	Lack of recognition, lack of transparency, inconsistent treatment of workers, non-involvement and participation and poor leadership style
Job design	Role ambiguity, broader scope of responsibility, excess workloads
Job demands	Come from demanding tasks, roles and interpersonal relationships
Life cycle	More pronounced at the decline stage when business viability is at its lowest, risking closure

Work stress major dimensions
Work stress can be better understood by also looking at job demands and job resources

Job demands
These are psychological, social, physical or organisational aspects of the job. They require physical and/or psychological effort or skills. They are linked to certain physiological and psychological costs (Demerouti et al., 2015). Examples include work pressure, work overload, unrealistic targets, interpersonal differences (conflicts), job insecurity and emotional demands. According to the JD-R model, when job demands are high, there is a need for additional effort to be exerted. This should help to achieve the work goals and to eliminate decreasing performance. However, this comes at a cost and can be overcome by taking a break, doing job rotation (switching tasks), or performing less demanding tasks (Demerouti et al., 2015).

Job resources
Job resources include autonomy, job control, feedback, career opportunities, role clarity, supervisor coaching and guidance, and social support (Schaufeli, Bakker & Van Rhenen, 2009). Job resources are supposed to reduce job demands and subsequent exhaustion (Mackey et al., 2017). Bakker and Demerouti (2007) observed that the adverse effect of job demands particularly on exhaustion was strong if workers lacked resources.

Work engagement

Work engagement is a positive, self-fulfilling, job-related state of mind, epitomised by vigour, dedication and absorption (Gagne, 2014; Schaufeli & Bakker, 2010). The terms employee engagement and work engagement are different, despite some authorities saying they can be used interchangeably. Work engagement refers to the relationship of the employee with his work only, whereas employee engagement tends to also include the relationship with the organisation (Bakker & Schaufeli, 2015; Mone & London, 2018).

Vigour is characterized by an individual who exhibits high levels of energy, mental resilience and the desire to invest lots of effort in his work as well as persevering even under difficult circumstances (Schaufeli& Bakker, 2010).

Dedication is denoted by strong involvement in one's work culminating in feelings of experiencing enthusiasm, relevance, inspiration, pride and a sense of significance (Schaufeli & Bakker, 2010).

Absorption is epitomised by having difficulties to detach oneself from work because of total concentration and happily engrossed in such work and time is seen to be '*flying'* (Schaufeli & Bakker, 2010).

According to Chen (2017), as well as, Bakker, Demerouti and Xanthopoulou (2012), work engagement   also enhances the following positive behavioural aspects among employees:
- treating each employee as an essential member of the team (organisation)who focuses on clear goals.
- feeling being trusted and empowered by receiving frequent and constructive feedback that help in developing new skills.
- feeling being thanked, respected and being recognised for achievement.
- employees having a sense of pride and loyalty arising from working for the organisation.
- instilling positive attitudes and behaviours among employees leading to improved business performance.
- capitalising on the employees' acquired knowledge and ideas in order to improve the organisation's products and services by promoting and supporting innovativeness.
- an employee being an ambassador and advocate of the organisation to other key stakeholders like users, clients, suppliers and customers.
- an employee developing a culture of going beyond ''the call of duty'', for example, going the extra mile to complete an assignment or task even after normal working hours.
- inculcating a sense of deeper commitment from employees culminating in reduced staff turnover, accident rates decline, fewer leave days' uptake, reduction of conflicts and grievances whilst productivity increases.

Table 3
Drivers and their characteristics that enhance work engagement

Driver	Characteristics
Individual	Optimism, self-efficacy, self-esteem and energetic (Bakker &Demerouti, 2017)
Organisation	Social support, good supervision, performance feedback, autonomous working environment (Bakker &Demerouti, 2017; Grover et al., 2017)
Job resources	Organizational climate, job control (Wiegel et al., 2016)
Personal resources	Resilience, influence on work environment (Kallio et al., 2016)

Service delivery
Service delivery is a common phrase used to describe the distribution of basic resources citizens depend on, like water, electricity, sanitation infrastructure, land, housing and education (Le Chen, Dean, Frant & Kumar, 2014).

Service quality
Service quality (Servqual) is a common quality management framework that measures quality and service delivery in the service sector (Nyeck, Morales, Ladhari & Pons, 2002; Soares, Novaski &Anholon, 2017). Zeithaml, Parasuraman and Berry (1990) originally identified ten elements of service quality, but these were collated into five factors namely: reliability, assurance, tangibles, empathy and responsiveness.

Table 4
The five dimensions of the Servqual (Zeithaml et al., 1990)

Dimension	Definition
Reliability	The ability to adhere and perform the promised service reliably and accurately.
Assurance	The knowledge and the courtesy of management and workers and their ability to demonstrate confidence and trust.
Tangibles	The appearance and attractiveness of physical facilities, infrastructure, equipment, work force and communication materials statements.
Empathy	The provision of hospitality, caring, individualised attention to customer.
Responsiveness	The eagerness to assist customers and provision of prompt service.

The following Table 5 shows major service delivery challenges in e-learning in distance education

Table 5
Challenges of e-learning among distance education learners (Kumar, 2015)

Challenge	Description
Adaptability struggle	Difficult to adapt to virtual computer based learning from traditional classroom face to face contact
Technical issues	Poor internet connectivity mainly in some developed countries
Computer literacy	Failure by many to use even simple computer packages due to lack of exposure in primary and even secondary education
Time management	Difficult to manage online learning due to several other commitments
Self-motivation	Some belief that use of computers is complicated and they may give up due to lack of self-motivation

Table 6
Major challenges affecting three key distance education stakeholders

Challenge	Description
Inadequate infrastructure and space allocations	Inadequate funding to procure computer hardware and software and for maintenance (Abidin, 2015; El Mansour & Mupinga, 2007).
Faculty development failure due to technological changes	Difficulties to adapt to online learning and inadequate training of academics (Abidin, 2015; El Mansour & Mupinga, 2007).
Faculty increased workload	Increase of workload due to online learning in additional to other traditional academic roles (Abidin, 2015; Acton, Chipman, Lunden & Schmitz, 2015; El Mansour &Mupinga, 2007).
Student persistence of traditional learning styles	Students still prefer traditional learning methods of classroom contact and change in delivery mode threatens enrolment (Abidin, 2015; El Mansour & Mupinga, 2007).
Academic dishonesty	Rampant plagiarism and low integrity of system (Abidin, 2015; El Mansour & Mupinga, 2007; Stephens, 2015).
Lack of protection of intellectual property and copyrights	Failure to protect access to developed learning materials by outsiders (Abidin, 2015; El Mansour & Mupinga, 2007).

Literature review on ODL academics changing roles

A review of the current literature on the changing roles of academics in ODL universities indicates the following research problems:

- Academics in ODL universities perform many administrative work tasks, previously conducted by non-academics (Courtney, 2013; Pickersgill, 1998; Ruth & Sammons, 2007). This could adversely affect service delivery at the ZOU, due to work overload and lack of some administrative skills that could be different from those of teaching.
- Transition phase from a correspondence to an e-learning mode in ODL, requires new approaches to be used by the academics. However, adequate proactive training and development for academics to acquaint themselves with these approaches may be lacking (Briggs, 2005; Roberts, 2018). This is the same scenario at the ZOU that is likely to affect service delivery, as the transition is not smooth, as well as, not being properly planned and cordinated.
- Work role over load in ODL academics has been identified as a large number of tasks and commitments within a limited period resulting in unrealistic deadlines and multiple competing priorities for academics (Barkhuizen et al., 2014; Kamuka, 2006). This statement shows that service delivery at ZOU may be compromised and this was even raised in a faculty meeting (ZOU, 2013b).
- The multiple role expectations involved in online learning may be causing increased stress and decreased work engagement in ODL academics (Briggs, 2005; Mashile, 2014; Moller, 2012). This could also be a strong indicator of the ZOU service delivery, which could be affected due to its academics increased, stress, burnout and decreased work engagement.
- ODL academics in their expected role of being responsible for online course delivery, face many challenges in terms of integrating applicable teaching practice, digital literacy, availability of equipment and effective student support (Berge, 2008; Courtney, 2013; Madikizela-Madiya & Le Roux, 2017). The changes being brought by online courses in the ZOU are adding more roles/duties for academics and may affect service delivery.
- The workload of academic staff in ODL needs to be reduced to allow time to reflect and pay attention to students and support them academically (Bates & Kaye, 2014). This is true even at the ZOU if service delivery is to improve, since the academics need more time to do research and develop learning materials. Thus, lack of proper service delivery to students at the ZOU seems to be a combination of

job demands (workload) that appear to be unrealistically high and inadequate preparation for implementing e-learning due to what appears to be a shortage of resources.

- Socio-demographic factors also play a significant difference on academics' willingness and motivation to stay within ODL institutions and these influence their attitudes and behaviour at the work place (Assenga, 2017; Thiele, Singleton, Pope & Stanistreet, 2016; Udeaja, 2017).

All of the above concerns point to the fact that changing work roles may affect service delivery by ODL institutions like the ZOU. Academics could be failing to adequately provide student support due to increasing workload and lack of training resources (Chen, 2017; Kurebwa, 2017). This may in turn lead to dissatisfaction among students, as their expectations are not met. Furthermore, what appears to be low quality tuition could culminate in low pass rates. As a result, enrolment figures may decrease and possibly even the ODL institution's (ZOU) reputation and image could suffer (Chadamoyo, 2016). A decrease in enrolment figures could have severe consequences, such as the ZOU collapsing (bankruptcy) due to the likelihood of its inability to break even and sustain its operations. This is against the backdrop of government intending to wean state universities from funding them so that they fend for themselves (Zulu, 2015).

In light of the above background information and current literature on ODL academics, this researcher was guided by the following Figure 1 showing the conceptual model used in the conducting of this study.
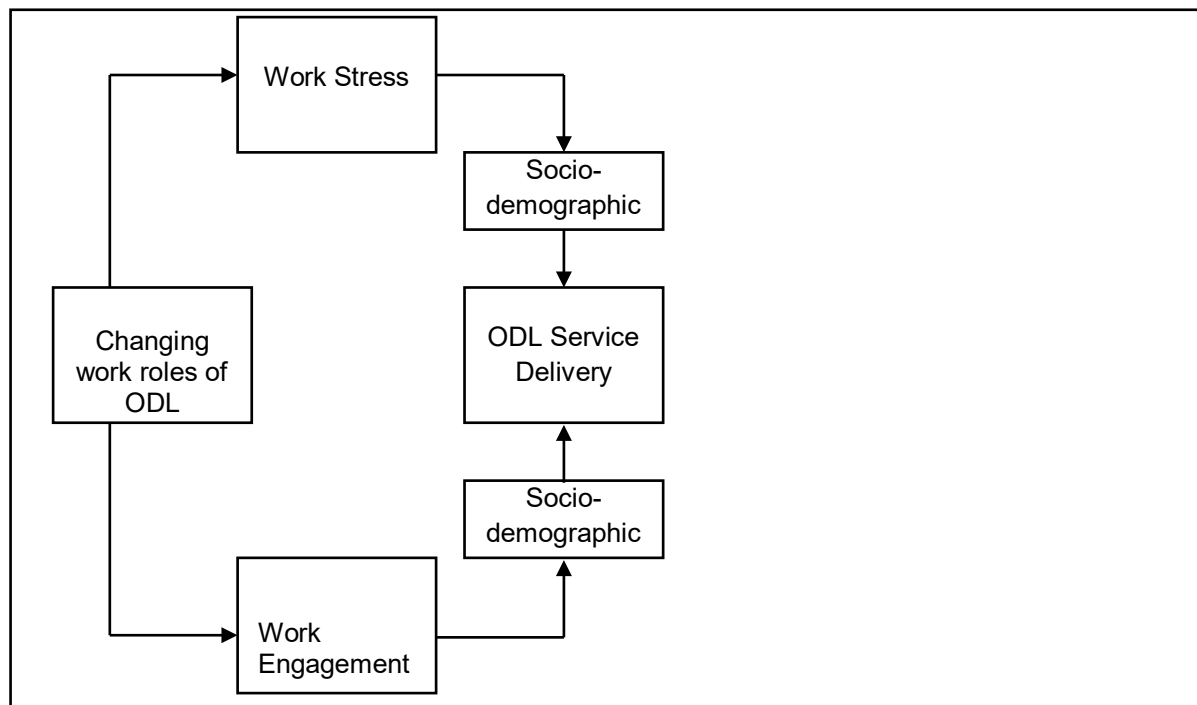
Figure1: Conceptual model on work stress, work engagement and service delivery for ODL academics (own compilation)

The model is premised on the following assumptions that;
- High stress will lead to low service delivery (inversely/negatively related).
- High work engagement will lead to better service delivery and vice versa (directly/positively related).
- Low stress causes high work engagement (inversely/negatively related)
- A combination of low stress and high engagement will result in high service delivery.

METHOD
The methodology was guided by the research onion (Saunders, Lewis& Thornhill, 2007) especially on the following aspects.
Philosophy
The *positivism philosophy* guided this study. Positivism is premised on the belief that knowledge can be derived from 'positive information' (Collis & Hussey, 2014; Felgel, 2016). It is based on empirical data, which is derived from a reliable measurement or observation (Malec, 2018).

Approach

This study used a *quantitative paradigm*. This quantitative research used a combination of statistical analysis and logical deductive reasoning in order to draw out inferences from the presented results (Howitt & Cramer, 2000; Kothari & Garg, 2014; Markey & Gass, 2016). The quantitative approach was guided by the use of standardised research instruments which were valid and reliable (Krosnick, 2018; Leedy &Omrod, 2016; Neuman, 2013).

Research Design

A *descriptive cross-sectional quantitative survey design* was used to cover different groups (Hanson &Mellinger, 2016) of academics and students at the same time. The researcher did not have control over the variables and only reported what was happening. The collected quantitative data from the survey was then subjected to scientific methods (quantitative methods) that analysed, examined and interpreted them in order to arrive at the generalisation and prediction of results (Nardi, 2018; Neeru, 2012). The study described the state of affairs, as they existed at the time of collecting data so that the reality was known. The argument for choosing a descriptive survey was based on the fact that, surveys provide a quick, efficient and accurate means of assessing information about the population from which information is scarce (Creswell, 2014; Punch, 2014).

Sampling frame

Selection of participants (respondents) was based on stratified random sampling. Final sample composition was made up of 83 academics and 101 students.

Research instruments

Three structured surveys were used. These are the JD-R questionnaire (Bakker & Demerouti, 2007) made up of five dimensions namely: overload, job insecurity, organisational support, relationships, and growth and advancement, the Ultrecht work engagement scale (UWES) questionnaire (Schaufeli, Bakker & Salanova, 2006) made up of three dimensions namely: vigour, dedication and absorption and the Servqual questionnaire (Zeithaml, Parasunaman & Berry, 1990) made up of five dimensions namely: reliability, assurance, tangibles, empathy and responsiveness. For the academics, the three questionnaires were combined into one for completion but students only completed the Servqual questionnaire. Response rates were 74% and 56% respectively, which was satisfactory as questionnaires normally record low responses (Leedy & Omrod, 2016; Nardi, 2018).

DATA ANALYIS

All data were presented and analysed using statistical methods by utilising the Statistical Package for Social Sciences programmes (SPSS) Version 25 for the Microsoft windows platform, and AMOS Version 24 (Field, 2013, Pallant, 2010, 2013). Statistical analysis determined the interrelationships between work stress, work engagement and service delivery in a changing world of work for academics in distance learning in Zimbabwe. The analysis, which comprised seven phases, is indicated in the following Figure 2.
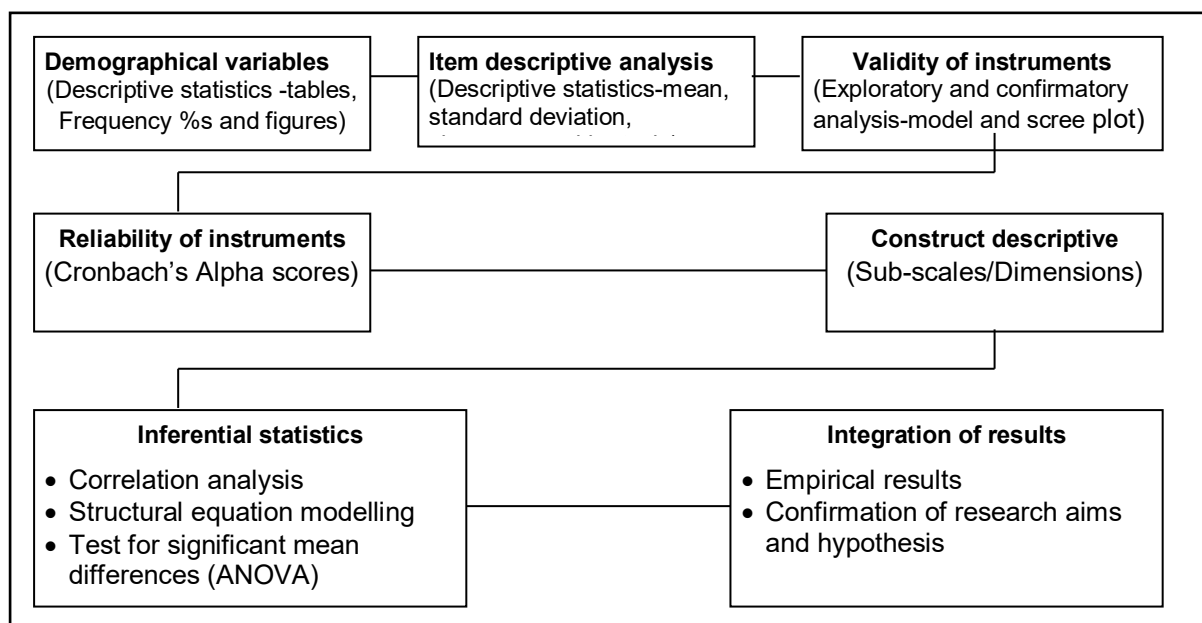

Figure 2: Flow diagram of the sequence of the statistical analysis (own compilation)

Confirmatory and exploratory analysis revealed a four-construct measurement model for work stress, a three-construct measurement model for work engagement and a four-construct measurement model for service delivery. The dimensions *empathy* (Servqual) and *overload* (JD-R) were eliminated from further analysis because their skewness and kurtosis showed that they were not normally distributed and hence not ideal for generalisation of results (D'Agostino, 2017). The Cronbach's Alpha coefficients for the three questionnaires are shown in the following Table 7.

Table 7
Cronbach's Alpha coefficients for the three measuring instruments

Measurement instrument	Dimension	Cronbach's Alpha coefficients
JD-R scale	Organisational support	0.784
	Job insecurity	0.822
	Relationships	0.886
	Growth and advancement	0.882
UWES	Vigour	0.861
	Dedication	0.813
	Absorption	0.781
Servqual	Tangibles	0.783
	Reliability	0.811
	Responsiveness	0.847
	Assurance	0.849

Values of Cronbach's Alpha for all the dimensions ranged from 0.733 to 0.886, which according to Tavakol and Dennick (2011) is acceptable, since the minimum threshold value is 0.7. All the constructs under JD-R scale were therefore internally consistent and satisfied the requirement for being used in estimating the models. When compared with the Cronbach's Alpha values on a study using the same measuring instrument (JD-R scale) on school educators in Pietermaritzburg, Kwazulu-Natal by Main (2011), they were; overload (0,736), job insecurity (0, 932), growth and advancement (0,762) and relationships (0,776), the results were relatively similar. Regarding internal consistency for the UWES by other studies, Storm (2002) obtained reliable Cronbach's Alpha coefficients as follows, vigour (0.78), dedication (0.89) and absorption (0.78) and Schaufeli et al. (2002) obtained the Cronbach's Alpha coefficients between 0.68 and 0.91, which confirms the almost similarity with this study. The Cronbach's Alpha coefficients for this study compared favourably with other studies with the five dimensions (tangibles, reliability, responsiveness, assurance and empathy) ranging from 0.785 to 0.917 (Markovic & Raspor, 2010) and from 0.72 to 0.86 (Yousapronpaiboon, 2014) for a related study on measuring service quality in higher education.

Correlational analysis revealed some significant relationships between work stress, work engagement and service delivery. The structural equation modelling indicated an adequate fit of the conceptual structural model and established the various relationships between the dimensions of work stress, work engagement and service delivery. The following Figure 3 shows such relationships
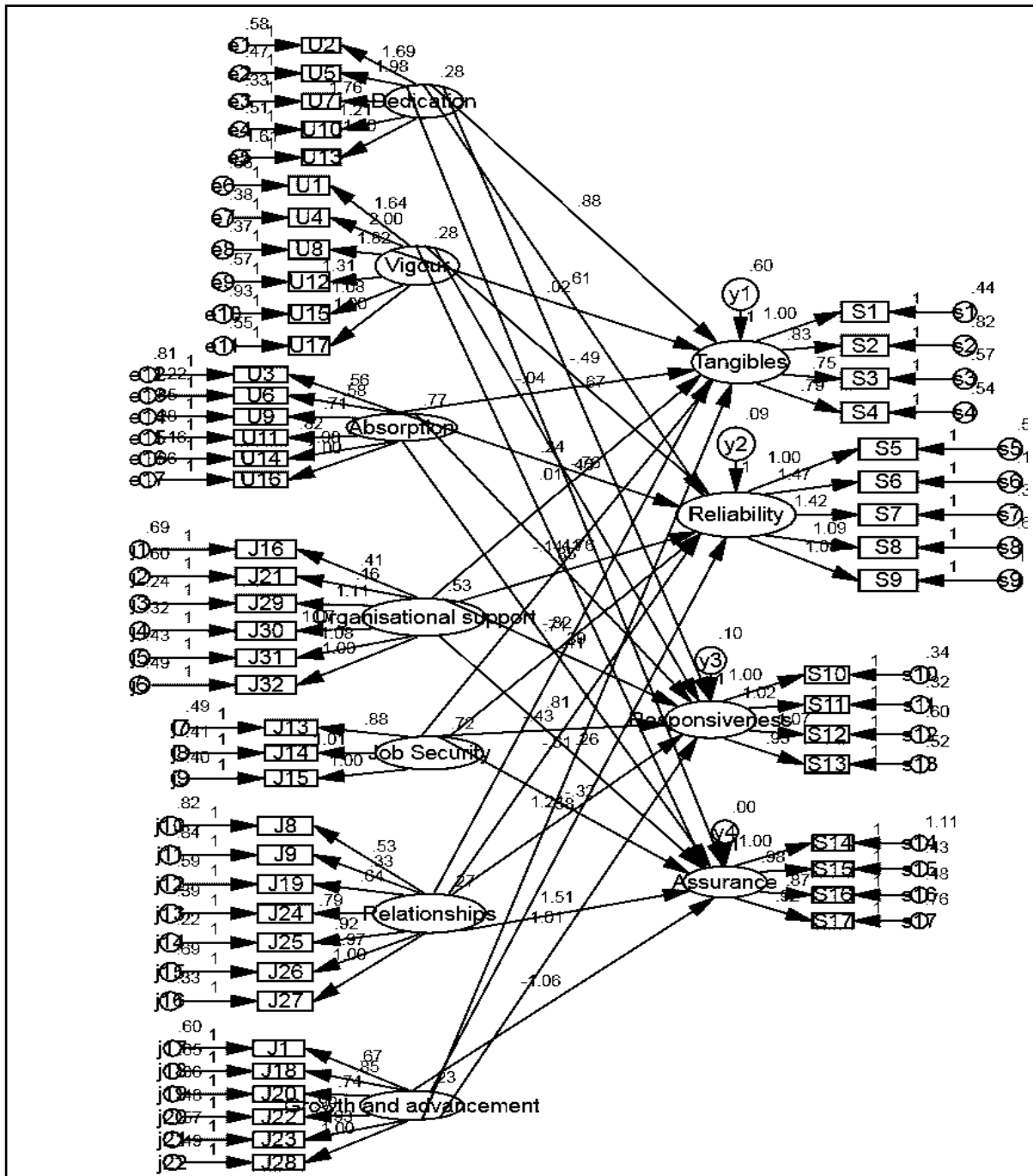
Figure 3:   *Final structural equation modelling (SEM)*

Since the non-centrality index Root Mean Square Error of Approximation (RMSEA) indicated that there was an adequate fit, the model was capable of providing insight into the relationships that exist between the constructs in the study. All the dimensions are shown in Figure 3 except empathy (Servqual) and overload (JD-R) as mentioned earlier. These relationships are presented under Conclusions of this study (next sub-heading). Tests for significant differences among different groups of academics based on their socio-demographic variables: age, gender, educational qualification, job title, administrative position, work experience, employment status were revealed, as well as, for students revealed that these socio-demographic variables had influence on academics' work stress, work engagement and service delivery and students sentiments on service delivery. The results also supported previous studies that socio-demographic factors have influence on academics' willingness, attitude and motivation to perform at ODL institutions (Thiele, Singleton, Pope & Stanistreet, 2016; Tladi, 2017).The *t*-test did not reveal any major differences on service delivery perceptions between the academics and students.

CONCLUSIONS

In terms of the empirical study, conclusions were drawn on the following research aims:

Research aim 1
The first research aim, namely *to determine the interrelationships between work stress (represented by job insecurity, organisational support, relationships, growth and advancement), work engagement (represented by vigour, dedication and absorption) and service delivery (represented by reliability, assurance, tangiblesand responsiveness) in ODL* was achieved through the following sub-aims;

Sub-aim 1.1
To determine the relationship between work stress and service delivery in ODL academics.
The empirical results were able to reject the null hypothesis and provided supportive evidence for the alternative hypothesis:
$H_{a1.1}$ There is a statistically significant relationship between work stress (and its sub-dimensions) and service delivery (and its sub-dimensions) in ODL academics
Therefore, the study arrived at a conclusion that:
- Relationships (sub-dimension of work stress) had significant positive relationships with reliability, responsiveness and assurance (sub-dimensions of service delivery).
- Organisational support (sub-dimension of work stress) had significant positive relationship with reliability (sub-dimension of service delivery).
- Job insecurity (sub-dimension of work stress) had significant negative relationships with reliability and responsiveness (sub-dimensions of service delivery).

Sub-aim 1.2
To determine the relationship between work engagement and service delivery in ODL academics.
The empirical results were able to reject the null hypothesis and provided supportive evidence for the alternative hypothesis:
$H_{a1.2}$ There is a statistically significant relationship between work engagement (and its sub-dimensions) and service delivery (and its sub-dimensions) in ODL academics
Therefore, the study arrived at a conclusion that:
- Absorption (sub-dimension of work engagement) had significant positive relationships with responsiveness, reliability, assurance and tangibles (sub-dimensions of service delivery).
- Dedication (sub-dimension of work engagement) had significant positive relationships with responsiveness, reliability and tangibles (sub-dimensions of service delivery).
- Vigour (sub-dimension of work engagement) had significant positive relationships with reliability, responsiveness, tangibles and assurance (sub-dimensions of service delivery).

Sub-aim 1.3
To determine the relationship between work stress and work engagement in ODL academics.
The empirical results were able to reject the null hypothesis and provided supportive evidence for the alternative hypothesis:
$H_{a1.3}$ There is a statistical significant relationship between work stress (and its sub-dimensions) and work engagement (and its sub-dimensions) in ODL academics.
Therefore, the study arrived at a conclusion that:
- Relationships (sub-dimension of work stress) had significant positive relationships with vigour and absorption (sub-dimensions of work engagement).
- Organisational support (sub-dimension of work stress) had significant positive relationships with vigour, dedication and absorption (sub-dimensions of work engagement).
- Growth and advancement (sub-dimension of work stress) had significant positive relationships with vigour and absorption (sub-dimensions of work engagement).

Research aim 2
To determine if some socio-demographical variables (*age, gender, educational qualification, job title, administrative position, work experience, employment status and number of years of learning*) of different groups have different impact on work stress, work engagement and service delivery in the ODL context.
The empirical results were able to conclude on the hypotheses of socio-demographic variables drawn from academics as shown below:

(a) Age

The empirical results rejected the null hypothesis and provided supportive evidence for the alternative hypothesis:

$H_{a2.1}$ There is statistically significant difference on the relationship between different ages of academics and work stress, work engagement and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There was statistically significant difference on absorption among academics of different age groups.

(b) Gender

The empirical results failed to reject the null hypothesis:

$H_{o2.2}$ There is no statistically significant difference on the relationship between different gender of academics and work stress, work engagement and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There was no statistically significant difference on the relationship between different gender of academics and any dimension of work stress, work engagement and service delivery in an ODL system.

(c)*Education qualification*

The empirical results rejected the null hypothesis and provided supportive evidence for the alternative hypothesis:

$H_{a2.3}$ There is statistically significant difference on the relationship between different educational qualifications of academics and work stress, work engagement and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There was only one significant difference pertaining to responsiveness among academics with different educational qualifications.

(d) Job title

The empirical results rejected the null hypothesis and provided supportive evidence for the alternative hypothesis:

$H_{a2.4}$ There is statistically significant difference on the relationship between different job titles of academics and work stress, work engagement and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There were three significant differences pertaining to job insecurity, responsiveness and growth and advancement among academics with different job titles.

(e) Administrative position

The empirical results rejected the null hypothesis and provided supportive evidence for the alternative hypothesis:

$Ha_{2.5}$ There is statistically significant difference on the relationship between different administrative positions of academics and work stress, work engagement and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There were two significant differences pertaining to growth and advancement, and tangibles among academics with different administrative positions.

(f) Work experience

The empirical results failed to reject the null hypothesis:

$H_{o2.6}$ There is no statistically significant difference on the relationship between different work experiences of academics and work stress, work engagement and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There was no statistically significant difference on the relationship between different work experiences of academics and any dimension of work stress, work engagement and service delivery in an ODL system.

(g) Employment status

The empirical results failed to reject the null hypothesis:

$H_{o2.7}$ There is no statistically significant difference on the relationship between difference in employment status of academics and work stress, work engagement and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There was no statistically significant difference on the relationship between different employment status of academics and any dimension of work stress, work engagement and service delivery in an ODL system.

The following conclusions on socio-demographic variables were drawn from the students.

(a) Age

The empirical results failed to reject the null hypothesis:

$H_{o2.8}$ There is no statistically significant difference on the relationship between different ages of students and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There were no any significant differences in perceived service delivery for students of different ages.

(b) Gender

The empirical results failed to reject the null hypothesis:

$H_{o2.9}$ There is no statistically significant difference on the relationship between different gender of students and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There were no any significant differences in perceived service delivery for students of different gender.

(c) Years of learning

The empirical results rejected the null hypothesis and provided supportive evidence for the alternative hypothesis:

$H_{a2.10}$ There is statistically significant difference on the relationship between different number of years of learning of students and service delivery in an ODL system.

Therefore, the study arrived at a conclusion that:

There were four significant differences pertaining to service delivery dimensions of responsiveness, assurance, empathy and reliability among students with different number of years of learning with the ODL university.

Research aim 3

To determine if academics and students have different perceptions on service delivery in ODL.

The empirical results failed to reject the null hypothesis:

H_{03} There were not major differences on service delivery perceptions between the academics and students.

Therefore, the study arrived at a conclusion that:

There were not major differences on service delivery perceptions between the academics and students on the sub-dimensions of tangibles, reliability, responsiveness and assurance.

Research aim 4

To determine if academics' work stress, work engagement and service delivery have a good fit with the data.

The empirical results rejected the null hypothesis and provided supportive evidence for the research hypothesis:

Ha4 The empirical relationship dynamics among the variables have a good fit with the theoretical model.

Therefore, the study arrived at a conclusion that:

The structural equation modelling had 24 paths out of 28, which had significant relationships showing that a framework could be constructed.

RECOMMENDATIONS

To achieve the purpose of the research based on the empirical aims , the results and conclusions arising there from, this section formulates recommendations for ODL academics, the ODL university and human resource management, as well as, for future research.

Recommendations for ODL academics and the ODL University

The results of this research provided the rationale for determining specific interventions that should improve the ODL university through efficient and effective service delivery by creating a conducive environment where academics are energised, committed and psychologically connected to their work.In light of the ever-changing ODL environment due to globalisation and technological innovations, academics are expected to perform additional and even more complex roles. ODL academics, in their expected role of being responsible for online course delivery, face many challenges in terms of integrating applicable teaching practice, digital literacy, availability of equipment and effective student support. The changes being brought about by online courses in the ZOU are adding more roles and duties for academics and as a result, tend to affect service delivery.

These new drivers of change should not be seen as sources of problems or challenges by academics and management, but as new opportunities that should largely involve the active involvement of academics in this process of change. It is recommended that the input of academics on how to implement such change is vital and should be taken on board. This holistic and integrated approach to such transformation, rather than to have such decisions being a preserve of senior management, should bring better results due to synergy and teamwork. This will also instil a sense of ownership among academics; thereby reducing chances of resistance to such change. The transition phase, from a classroom tutor-student contact approach, using correspondence, to an e-learning mode in ODL, require acquisition of new skills and technical ability of academics, as well as, the learners (students). It is recommended that proactive training and development be done in phases. The first phase should be for all academics both full time and part time, so that they fully acquaint themselves with online teaching, before doing the same to students. During this phase, the academics should also be provided with technical support since they will be mastering the new skills. This should make learning more efficient thereby improving service delivery in the ODL University.

In order to make training more user friendly and effective, the ODL institution should overcome the constraint of lack of access to online facilities. The institution should procure more speedy and efficient computers in all regional campuses beginning with those with satellites that are located in remote areas. This can be feasible if resources are mobilised by vigorously embarking on income generating projects, networking with the corporate organisations, particularly in the private sector and forming strategic alliances or partnerships. The networking can be extended to the international community, for example by collaborating with foreign universities, which may include staff exchange programmes so that academics are exposed to even modern online learning facilities. The partnerships could also include conducting joint research projects in the partners' countries in order to obtain the much-needed foreign currency. Another avenue, would be to come up with a vibrant Alumni association to incorporate those former students gainfully employed in foreign countries and could assist with the remittance of foreign currency or donating the necessary equipment. A memorandum of understanding with the private sector can be modelled along a win-win situation whereby the ODL university provides training to their staff members, while in return, those companies may assist financially or technically in the procurement of computers or setting up computer laboratories. As a state ODL institution, government should continue to fund and do away with its plan to wean state universities from funding, given that the prevailing economic state of affairs is not possible to enable the ODL university and others to break even. Government has the social justice responsibility to support ODL as it provides a cheaper option for working adults to gain access to higher education.Continued provision of government grants should augment whatever income generated by the ODL university, mostly from tuition fees, to acquire learning resources like computer software and hardware in order to improve the efficiency of the e-learning delivery mode. This is likely to reduce academics' work stress and improve their work engagement and service delivery.

Work role overload in ODL academics comprises a large number of tasks and commitments within a limited period, resulting in unrealistic deadlines and multiple competing priorities for academics. The multiple role expectations involved in online learning is stressful and leads to decreased work engagement. It is recommended that there is a need to streamline the roles of academics by reducing their workload, which comprises a lot of administrative work. This would create and allow more time for them to reflect and pay attention to students. In addition, this could improve student support by having more time for research, prompt feedback on assignments marking and developing of quality learning materials. Largely support staff or non-academics should do the administrative work.

The tangibles in service quality are employed by organisations to improve customer satisfaction. The appearance of physical facilities, equipment, staff and communication materials has become key in creating an ambience that reflects an upmarket brand image as well as providing a competitive edge over competitors. Based on the empirical results of the study, the ODL institution should improve its tangibles, which were rated lowly by both students and academics. They indicated that academics do not have modern looking equipment and that their offices including their secretaries and buildings were not visually appealing. The ODL institution rents many buildings for its operations and this might make it difficult for it to make any refurbishments or improvements, since some of the structures need attention in order to give them a 'facelift'. The challenge is that the property owner (lessor) might not want to incur additional costs to do such refurbishments. It is recommended that the ODL institution develop a number of stands it has acquired for a long time which have not yet been developed. The new buildings should be able to provide enough office space so that each academic occupies one office alone, unlike the prevailing scenario where even three academics share one office. This has a negative impact on service delivery, as well as, student satisfaction since one may not feel free to discuss an issue or concern with a particular academic due to lack of privacy in those offices. This also calls for the mobilisation of resources to have better infrastructure and well-equipped staff offices comprising of modern computers, laptops and iPads. There is also need for the ODL university to subscribe to antiplagiarism software providers of Turnitin to improve service delivery.

Recommendations for human resource management

The literature review contributed a valuable foundation for the study of the conceptualisation of work stress, work engagement and service delivery in ODL academics. The empirical study then confirmed the interrelationships between the three constructs on ODL academics in light of the changing world of work. The results should be taken on board to assist with the formulation of policies and addressing pertinent issues that should improve human resource management, particularly in higher education as discussed below.

If the ODL work environment fails to cope with changes in technology and increasing globalisation, the academics will continue to face serious challenges such as stress, burnout, insecurity, low levels of energy, low motivation, poor health, low resilience, low optimism, low self-esteem, low self-efficacy, low enthusiasm, low involvement in their work, and lack of job satisfaction. It is recommended that human resource practitioners, together with the support of senior management could develop policy intervention measures that improve the

working conditions of academics so that their health, well-being and welfare, enable them to perform to their maximum potential. There is therefore need to rationalise and streamline their roles, so that they are not stressed or disengaged. This requires reorientation of job redesign, availability of resources to improve utilisation of technology, granting tenure for job security and promoting teamwork to make the working environment conducive.

The results of the study suggest that human resources practitioners may also need to consider that different demographic variables (age, gender, marital status, educational level, job level, administrative position, employment status, race, years of service and the faculty/department) have different influence on work stress, work engagement and service delivery of different groups of academics. This is true despite these different groups of academics being in the same profession. As this has a bearing on the behaviour or conduct of academics at work, there is need to create an environment that accommodates these different academics based on their demographic variables to improve organisational behaviour.

Recommendations for future research
- Future research could also attempt to accommodate both the ODL and conventional universities in order to come up with comparisons that would help policy makers to come up with specific needs and roles of academics in each of the two types of universities rather than using an all-inclusive treatment or approach.
- Future research should also include qualitative aspects in the measuring instrument by possibly adopting the mixed methodology approach. Semi-structured questionnaires can be designed to accommodate personal opinions, explanations, justification or reasons for selecting particular option(s) and even suggestions by respondents, so that, there would be more data for analysis rather than confining to the use of structured questionnaires like in this research. In the same context, future research can also use *triangulation* in data collection. Two instruments, for example, a structured questionnaire and an unstructured interview guide can be used. Academics because of their large numbers can be given questionnaires and senior management members who are few like the deans, the registrar, the finance director and the human resources director, can be interviewed. Some senior government officials preferably from the parent Ministry of Higher Education, Science and Technology development can also be interviewed. This would allow all key stakeholders to be involved in matters or issues that affect ODL academics in order to get balanced views.

ACKNOWLEDGEMENTS

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