

A REVIEW OF ACADEMIC PERFORMANCE FACTORS IN THE CONTEXT OF E-LEARNING: THEORIES AND EMPIRICAL STUDIES

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ABSTRACT

There are currently more than 500 commercial e-Learning software packages and 300 educational e-Learning software packages, and their benefits to their users are well documented. For instance, with e-Learning, the rigidity of teaching and learning timetables can be overcome. Shockingly, high education still witnesses intolerable levels of academic failure even in this e-Learning era. This study will therefore attempt to examine the impact of e-Learning on academic performance based on the perceptions of academics. It is a literature review of thirty-four (34) studies. Its findings reveal that according to the perceptions of academics, the impact of e-Learning on academic performance depends on: the demographics of the learners; their intensity of use of e-Learning; their self-efficacy and learning approach; their sense of community and interactivity; their perceptions on the suitability of e-Learning; and their motivation and pride. This study also recommends more research on the validation of its proposed theoretical framework, and its identified factors, because the reviewed literature is not unanimous on their perceived effect on the impact of e-Learning on academic performance. The main contribution of this study is to broaden the scope of academic performance factors in the context of e-Learning compared to similar past reviews with a limited pre-defined scope of academic performance factors.

Keywords: *e-Learning, Academic Performance, Learning Theories, Theoretical Model, Literature Review*

1. INTRODUCTION

There are currently many definitions for e-Learning. For example, Guri-Rosenblit (2005:469) defines e-Learning as “the use of electronic media for a variety of learning purposes that range from add-on functions in conventional classrooms to full substitution for the face-to-face meetings by online encounters”. For Zhang (2003), e-Learning refers to any type of learning situation when instructional content is delivered electronically via the Internet when and where people need it. As for Hrastinski (2008:1755) e-Learning refers to teaching and learning “online through network technologies”. All these three examples of e-Learning definitions are insisting on the online aspect of e-Learning, but offline versions of e-Learning also exist. There are two types of e-Learning, namely synchronous e-Learning, and asynchronous e-Learning. These two e-Learning types are well contrasted by Hrastinski (2008) who defines synchronous e-Learning as a learning process that occurs in a two-way real-time communication, and asynchronous e-Learning as a learning process that occurs in a one way non-real-

time communication. Examples of asynchronous e-Learning tools include discussion boards, e-mails, repository; while examples of synchronous tools include chats and video conferencing. These e-Learning tools are sometimes hosted in specialised e-Learning software packages known as learning management systems or learning content management systems.

E-Learning offers several benefits to different education stakeholders including students, educators, administrators, and so on. It gives to students the ability to review previously learned lessons in a convenient manner, as well as the freedom to decide when and where to learn their lessons. According to Cantoni (2003:336), its “delivery of content in smaller units may contribute further to a more lasting learning effect”. E-Learning also gives to students the freedom to express their thoughts and ask questions without limitations, and it offers them some levels of independence from the time constraints of their instructors (Bouhnik and Marcus, 2006). It gives to instructors and to researchers the ability to

conveniently provide satisfactory responses to their students' queries and to share ideas and resources with their peers. For universities, e-Learning is able to compensate for shortages of academic staff and for the lack of infrastructure. Its ability to provide learning strategies that are economically viable is a win-win formula both for parents and for university administrations.

It cannot be taken for granted that the above highlighted benefits of e-Learning always translate to its successful adoption, hence, the purpose of this study to examine existing theories on the factors affecting the perceptions of academics on the impact of e-Learning on academic performance. The adoption of e-Learning in other contexts different from the higher education sector (e.g. primary and secondary education, cooperate training) is consequently excluded from the scope of this study.

2. STATEMENT OF PROBLEM

One would expect that the above presented benefits of e-Learning would have eradicated academic failure by now, but unfortunately, the surprising fact is that academic failure remains high especially in universities despite all the above presented benefits of e-Learning. Consequently, the main problem at the heart of this study is the high failure rate in universities in this e-Learning era. For example, Sadler and Erasmus (2005) report that black students only enjoyed a pass rate of 21% in 2003, and a mere 9% in 2004, at the University of South Africa's CTA (Certificate in the Theory of Accounting). They also mention a university with a failure rate of 72%. The same authors are adamant that "there is a huge number of students enrolling in tertiary education who do not graduate" (Bennedsen and Caspersen, 2007: 4). Similar trends are reported by Selingo (2013) according to whom only 38 percent of Fairleigh Dickson's students graduated in 2006. These reported failure rates in tertiary education are alarming; hence the need to investigate them further in this e-Learning era.

3. AIM AND OBJECTIVES

The above first two sections can be summarized in two sentences. On one hand, there is a perception that e-Learning and its LMSs and LCMSs are so powerful that they have the ability to combat academic failure. On the other hand, there is another perception that e-Learning with all its LMSs and LCMSs are not powerful enough to combat academic failure. These are legitimate

perceptions emanating from diverse sources according to various factors. The aim of this study is therefore to design a theoretical model of the perceived factors affecting the impact of e-Learning on academic performance, from the perspective of universities academics. This aim will be achieved by three objectives: a) To identify from the existing literature the main perceived factors affecting the impact of e-Learning on academic performance, from the perspective of universities academics, b) To identify suitable theories supporting the perceived factors affecting the impact of e-Learning on academic performance, from the perspective of universities academics from the existing literature, and c) To compare the current literature review against similar previously published reviews and to highlight its research gaps.

The above announced aim and objectives can be translated into the following research question and sub-questions:

Research question: How can a theoretical model be crafted from the knowledge of the perceived factors affecting the impact of e-Learning on academic performance, from the perspective of universities academics?

First sub-question: What are the main perceived factors affecting the impact of e-Learning on academic performance, from the perspective of universities academics in the existing literature?

Second sub-question: What are the theories that are supporting the existing studies on the perceived factors affecting the impact of e-Learning on academic performance, from the perspective of universities academics?

Third sub-question: What is the added value of this literature review on the perceived factors affecting the impact of e-Learning on academic performance, from the perspective of universities academics, compared to similar existing reviews?

4. EXISTING LITERATURE REVIEWS ON THE IMPACT OF E-LEARNING ON ACADEMIC PERFORMANCE

This section intends to provide a concise presentation of existing literature reviews on the impact of e-Learning on academic performance. This study only found four (4) existing literature reviews on the impact of e-Learning on academic performance: Bernard et al. (2004), Li and Ma (2010), Lahti et al. (2012), and Broadbent and Poon (2015).

The literature review conducted by Bernard et al. (2004) is a presentation of 232 existing studies

on the impact of distance education (DE) and traditional classroom-based instruction on student achievement, attitude, and retention. It includes papers published in the time period between 1985 and 2002. These papers were collected from various data sources such as Electronic databases (e.g. ProQuest, ERIC, PsycINFO), Web search engines (e.g. Google, AlltheWeb, and Teoma), conference proceedings (e.g. E-Learn, SITE, WebNet), reference lists of several earlier reviews (e.g. Allen et al., 2002; Cavanaugh 2001; Shachar 2002), and the manual search of distance learning journals (e.g. Distance Education, the Journal of Distance Education, Open Learning). Studies included in this review all had higher education students and/or academics as participants. Bernard et al. (2004) found that synchronous DE has a small but significantly negative effect on students' achievement and on their attitude, however, it has as small but significantly positive effect on their retention. This study also found that asynchronous DE has as a negative effect on students' attitude and an even bigger negative effect on their retention. However, it has a significantly positive effect on students' achievement.

Li and Ma (2010) is a presentation of forty-six (46) existing studies on the impact of the use of Computer Technology (CT) on academic performance in mathematics for K-12 learners. It includes papers published in the time period between 1990 and 2006. These papers were collected from research databases such as ERIC (1990–2006), Education Full Text (995–2006), ProQuest Digital Dissertations and Thesis Full-text, and PsycINFO (1990–2006). Studies from Li and Ma (2010)'s review included elementary school learners, secondary school learners, middle school learners, junior high school learners, and high school learners either from public schools or from private schools. These studies were either surveys or experiments. The overall finding from Li and Ma (2010) supports the positive impact of the use of Computer Technology (CT) on academic performance in mathematics for K-12 learners.

The literature review conducted by Broadbent and Poon (2015) is a presentation of twelve (12) existing studies on the impact of self-regulated learning on academic performance in higher education. It includes papers published in the time period between 2004 and December 2014. These papers were collected from research databases such as PsycINFO, CINAHL Complete, ERIC, MEDLINE, and psychARTICLES. Studies

included in this review all had higher education students as participants. These studies were surveys or experiments. The following nine (9) factors were found to have an effect on the impact of e-Learning on students' academic performance: metacognition, time management, effort regulation, peer learning, elaboration, rehearsal, organisation, critical thinking, and help seeking.

Lahti et al. (2012) is a presentation of eleven (11) existing studies on the impact of e-Learning on knowledge, skills, and satisfaction for nursing students. It includes papers published in the time period between 1948 and 2010. These papers were collected from research databases such as MEDLINE, CINAL, Psychinfo, and Eric. These databases were searched during the month of May 2010 and during the month of December 2010. Studies included in this review all used experiments only as their research method. This review does not present the factors that are influencing the impact of e-Learning on academic performance; instead it simply presents results from existing literature supporting that e-Learning has an impact on the knowledge, skills, and satisfaction of nursing students.

The current review is different from each of the other above presented four reviews as hereby briefly outlined. The review conducted by Bernard et al. (2004) focuses on distance education (DE), but the current review focuses on e-Learning. Moreover, the review conducted by Li and Ma (2010) focuses on mathematics for K-12 learners but the current review does not restrict itself to one single academic subject area. Similarly, the review conducted by Lahti et al. (2012) focuses on nursing students but the current review does not restrict itself to one single academic subject area. Finally, the review conducted by Broadbent and Poon (2015) focuses on the self-regulated learning approach but the current review does not restrict itself to one single learning approach.

The papers included in this review are studies that are based on the impact of e-Learning in all areas of education for higher education, whereas the studies included in the review by Li and Ma (2010) are based on the use of Computer Technology (CT) on academic performance in mathematics for K-12 learners only. The current review included papers published in the time period between 2003 and 2016 as compared to the review by Li and Ma (2010) that included studies published in the time period between 1990 and 2006. The papers

included in this review used higher education students as participants, compared to studies from Li and Ma (2010)'s review included elementary school learners, secondary school learners, middle school learners, junior high school learners, and high school learners either from public schools or from private schools. The overall finding from Li and Ma (2010) supports the positive impact of the use of Computer Technology (CT) on academic performance in mathematics for K-12 learners, whereas, the current study propose a theoretically sound model of factors effecting academic performance in an e-Learning context.

The main difference between the current study and the study by Broadbent and Poon (2015) is that, the study by Broadbent and Poon (2015) only reviewed existing studies on the impact of self-regulated learning on academic performance in higher education, while, the current study reviewed the general impact of e-Learning.

The current review included papers published in the time period between 2003 and 2016 as compared to the review by Bernard et al. (2004) that included studies published in the time period between 1985 and 2002. Studies included in the current review are either survey or experiment studies with empirical results whereas, the study by Bernard et al. (2004) did not specify this information. Also, the current study developed a theoretically sound model as compared to the study by Bernard et al. (2004) that only reported the findings of the review.

5. RATIONALE

This study is different from the above reviewed studies in a sense that these existing reviews either specific to one target group such as nursing (e.g. Lahti *et al.*, 2012) or to one learning approach such as self-regulated learning approach (e.g. Broadbent and Poon, 2015), but this current review covers all types of target groups and all types of learning approaches. One may ask why are learning approaches such as self-regulated learning or target groups such as nursing important when considering academic performance in e-Learning, and why is there a need to conduct another literature review when these two factors are changed? Learning approaches and target groups are certainly important when considering academic performance in e-Learning simply because academic performance factors may differ from one target group to another target group, as well as from one

learning approach to another learning approach. This is the main reason why there is a need to conduct a different literature review when these two factors are changed in order to explore more on the impact of e-Learning on academic performance.

6. METHODOLOGY

This study used a systematic literature review methodology as defined by Ford *et al.* (2011) who asserts that “a systematic literature review is a summary and assessment of the state of knowledge on a given topic”. This study started with the googling of the composite keyword “factors affecting” + “impact of e-Learning” + “academic performance” in google scholar in pursuit of the first objective of this study. Let us acknowledge from the onset that restricting the selection of papers to google scholar is an important limitation and other databases such as Taylor & Francis and Web of Science could also be considered. The choice of google scholar by this study is simply linked to the fact that google scholar can be considered as a gateway to access free publications. This search led to the selection of thirty-four (34) studies that are reporting on the impact of e-Learning on academic performance in higher education. It included papers published in the time period between 2003 and 2016. These papers were selected if they were freely available on google scholar and if they contained some empirical results either from surveys, from experiments, or from case studies. This search took place during the time period between the month of February 2017 and the month of April 2017. The findings of this review are presented on the next section as a result of the analysis of the secondary data that was collected by this study.

7. FINDINGS

The purpose of this section is to fulfil the first two (2) objectives of this paper which are: a) to identify from the existing literature the main factors that affect the perceptions of academics on the impact of e-Learning on academic performance, b) to craft these factors into a theoretical conceptual framework of the factors affecting the perceptions of academics on the impact of e-Learning on academic performance. The reviewed studies are presented according to seven themes: their authors and years publication, their countries and continents, their theories and models, their analysis methods, and their academic performance factors in the e-Learning context as perceived by academics. Table 1 to table 5 and appendix A are showing how

this review uses paper identification numbers for the identification of its studies. These tables also make use of the following abbreviations: POC (Positive Correlation), NEC (Negative Correlation), and NOC (No Correlation)

7.1 Authors and publication years

Thirty-nine (39) different names are cited as the main authors of the thirty-four (34) papers of this review. There is more than one paper in this review for three of these authors: Islam (2012, 2013, 2015), Lee and Lee (2008), Lee (2009), McGill (2008), and McGill and Klobas (2008). Almost half of these papers (49%) were published during the time period between the year 2008 and the year 2012. Almost a third (36%) of the papers were published during the time period between 2013 and the year 2017; and the fifteen percent (15%) were published during the time period between 2003 and the year 2007.

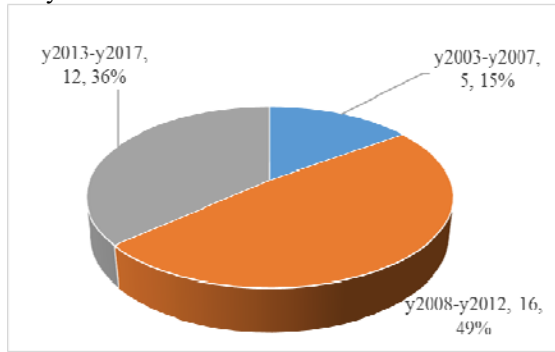


Figure 1: No. Of Papers Per Time Period

7.2 Continents and countries

Antarctica is the only continent that is not represented in the thirty-four (34) papers included in this review. Europe is represented in this review by thirty percent (31%) of the studies. Asia is represented by thirty-one (30%) of the studies. North America is represented by eighteen percent (18%) of the studies. Australia is represented by fifteen percent (15%) of the studies, and Africa is represented by six percent (6%) of the studies. European countries represented by this review are Spain with three (3) studies, Finland with three (3) studies, Netherlands with two (2) studies, France, and Greece with one (1) study each. Asian countries represented by this review are Malaysia with three (3) studies, Taiwan with two (2) studies and South Korea with two (2) studies, Philippines, Korea Republic, and Qatar (1) with one (1) study each. North American countries represented by this review are Canada with four (4) studies and USA

with two (2) studies. The Australian countries represented in this review is Australia with five (5) studies. African countries represented in this review are Kenya with one (1) study, and Nigeria with one (1) study.

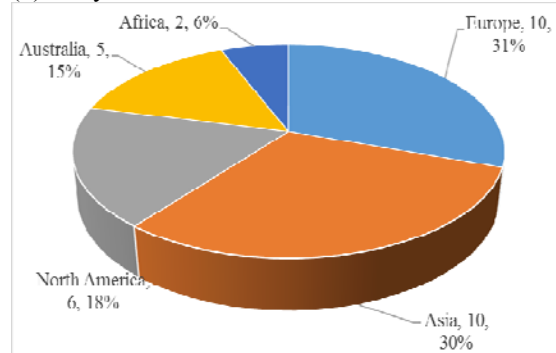


Figure 2: No. Of Papers Published Per Continent

7.3 Sample sizes and research populations

Students from higher education institutions constitute the research population of all the thirty-four (34) papers included in this review. Forty-four percent (44%) of the studies have a sample size between 101 and 300. Twenty-three (23%) have a sample size between 30 and 100. Twenty-one percent (21%) of the studies did not specify their sample size. Nine percent (9%) of the studies have a sample size between 501 and 1500, and three percent (3%) of the studies have a sample size between 301 and 500.

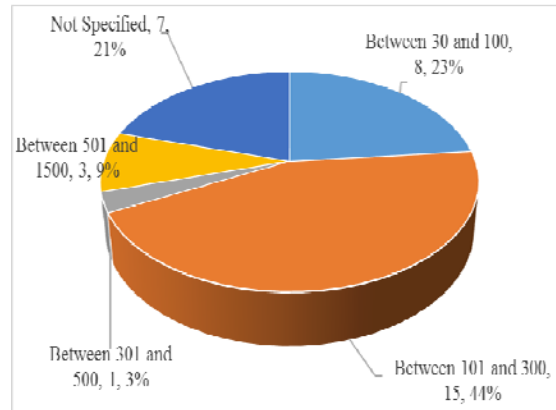


Figure 3: No. Of Papers Published Per Sample Size Interval

7.4 Research instruments

Thirty-seven percent (37%) of the studies included in this review did not specify their research instrument. Nineteen percent (19%) of the studies adopted their research instrument from Davis's (1989). Eleven percent (11%) of the studies

adopted their research instrument from Lee et al. (2002 and 2008), and the same applies for Goodhue and Thompson (1995), Sun et al. (2008), and Pintrich et al. (1991 and 2000).

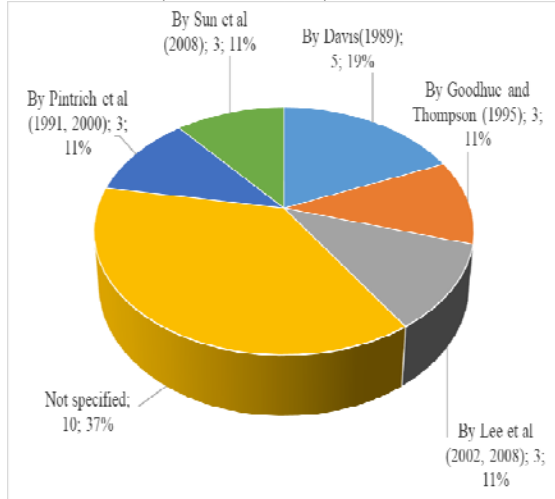


Figure 4: No. Of Papers Published for the different Research Instruments (Scales)

7.5 Theories and models

Almost half (49%) of the studies included in this review did not specify their theoretical model or framework. Fifteen percent (15%) of the studies used a self-developed theoretical framework. Twelve percent (12%) of the studies adopted TAM as their theoretical framework. Six percent (6%) of the studies adopted Technology-to-performance chain model, and the same applies for Information systems success model, as well as the structural equation model

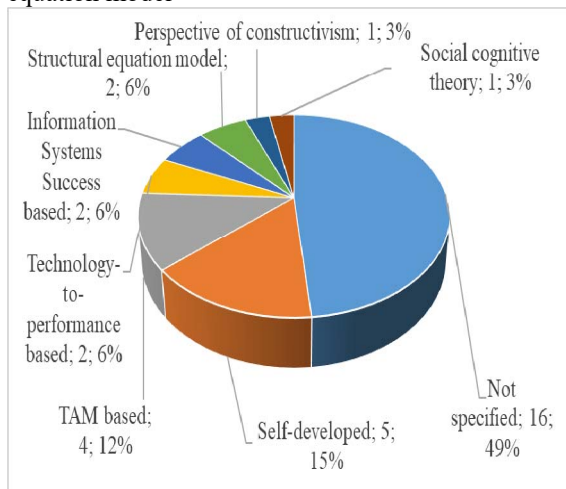


Figure 5: No. Of Papers Published Per Theory or Model

7.6 Analysis methods

Fifty percent (50%) of the studies included in this review used Pearson correlation as their

analysis method. Fourteen percent (14%) of the studies used SEM (structural equation modelling), twelve percent (12%) of the studies used t-test and the same applies to PLS (partial least square). Six percent (6%) of the studies used ANOVA and only one percent (1%) used ANCOVA. Three percent (3%) of the studies did not specify their analysis method.

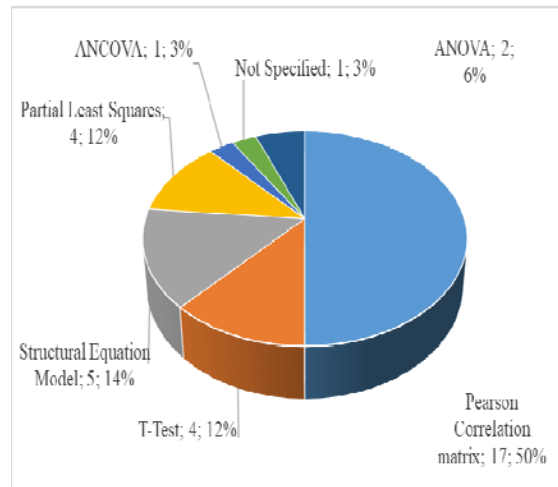


Figure 6: No. Of Papers Published Per Research Method

7.7 Academic performance factors and the new conceptual model

The different academic performance factor identified by the thirty-four (34) studies included in this review can be grouped into six (6) categories: a) Demographics; b) Intensity of use of e-Learning; c) Self-efficacy and learning approach, d) Sense of community and interactivity, e) Perceptions on the suitability of e-Learning, and f) Motivation, pride, and computer anxiety.

Thirty-five percent (35%) of the factors can be considered as Intensity of use of e-Learning. Self-efficacy and learning approach follows with twenty-two percent (22%). Sense of community and interactivity cover the nineteen percent (19%) of the factors, followed by perceptions on the suitability of e-Learning with sixteen percent (16%). While the demographics had a portion of seven percent (7%), and motivation, pride, and computer anxiety are only three percent (3%) of the factors affecting instructors' perceptions on the impact of e-Learning on academic performance.

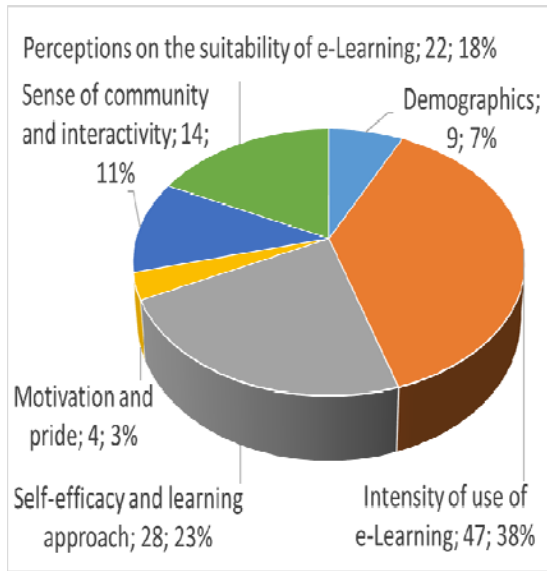


Figure 7: No. of factors affecting academic performance

7.7.1 Demographics

Six (06) studies [05, 06, 09, 16, 24, 32] from this review have studied the impact of six (6) demographic factors on academic performance in the e-Learning context. These six (06) demographic factors are Gender/sex, Age, Subject, Location setting, and On-line distance education experience. The findings from these six (6) studies differ on the existence and nature of the correlation between the above identified demographic factors and academic performance in the e-Learning context. For example, study number sixteen (16) and study number twenty-four (24) found that age does not have any effect on academic performance in the context of e-Learning, but study number nine (09) found that age has a negative effect on academic performance in the context of e-Learning. Further details on these correlations can be seen on Table 1.

Table 1: Demographic factors

| No | Variable(s) | Result |
|----|---------------------------------------|-------------------|
| 05 | On-line distance education experience | POC |
| 06 | Gender Location setting Subject | POC POC POC |
| 09 | Age | NEC |
| 16 | Gender Age | NOC NOC |
| 24 | Age | NOC |
| 32 | Gender | POC |

7.7.2 Intensity of use of e-Learning

Twenty (20) studies [01, 02, 03, 04, 06, 08, 09, 10, 16, 17, 18, 21, 23, 26, 27, 29, 30, 31, 32, 33]

from this review have studied the impact of intensity of use of e-Learning on academic performance. The forty-one (41) e-Learning intensity of use factors identified by these twenty (20) studies are presented by Table 2. For example, some of these factors include the number of quiz viewed, the number of online classes, and the hours spent online. The findings from these studies differ on the existence and on the nature of the correlation between e-Learning intensity of use and academic performance. For example, study number one (01) found that the number of quiz viewed has a positive impact on academic performance in the e-Learning context, but study number eight (08) found that the number of quiz viewed does not have any effect on academic performance in the context of e-Learning. Further details on these correlations can be seen on Table 2

7.7.3 Self-efficacy and learning approach

Fifteen (15) studies [02, 07, 09, 12, 15, 16, 19, 20, 21, 22, 24, 25, 28, 31, 32] from this review have studied the impact of self-efficacy and learning approach on academic performance in the e-Learning context. The twenty-six (26) self-efficacy and learning approach factors identified by these fifteen (15) studies are presented by Table 3. For example, some of these factors include internet self-efficacy, collaborative learning, and ability to use communication tools. The findings from these studies differ on the existence and on the nature of the correlation between self-efficacy and learning approach, and academic performance in the e-Learning context. For example, study number twenty-one (21) found that internet self-efficacy has a negative impact on academic performance in the e-Learning context.

Table 2: Intensity of use of e-Learning

| N o | Variable(s) | Result |
|-----|--------------------------------|--------|
| 01 | Number of online sessions | POC |
| | Number of links viewed | POC |
| | Number of quiz views | POC |
| | Number of wiki views | POC |
| | Largest period of inactivity | NEC |
| | Average time per session | NEC |
| | Irregularity of study interval | NEC |
| | Time until first activity | NEC |
| | Number of discussion posts | NOC |
| | Irregularity of study time | NOC |
| 02 | Studying through e-learning | POC |
| 03 | Use of QUEST e-Learning tool | POC |
| 04 | Use of WBLE e-Learning tool | NEC |
| 06 | Hours spent online | POC |

| | | |
|----|---|--|
| 08 | Reading and posting messages Quiz efforts Number of files viewed Number of assignments viewed Number of Quizzes viewed Number of Chat talk | POC POC POC NOC NOC NOC |
| 09 | Number of online class | NEC |
| 10 | Use of blended e-Learning | NOC |
| 16 | Time spent on e-learning Time spent on non-relevant readings Time spent on relevant readings | NOC NOC NOC |
| 17 | Time Flexibility Time-On-Task Working time Time of the day | POC POC NOC NOC |
| 18 | Task-technology fit | POC |
| 21 | Contribution of e-Learning component in the overall Course structure | NOC |
| 23 | Use of Mac-CARE | POC |
| 26 | Use of LearningSpace | POC |
| 27 | Overall grade for all courses Class participation Forum posting quantity Forum posting quality | POC POC NOC NOC |
| 29 | Total studying time in LMS | POC |
| 29 | Regularity of learning interval in LMS | POC |
| 29 | Number of downloads Login frequency in LMS | POC NOC |
| 30 | Participation in e-Learning | POC |
| 31 | Engagement with peers and teachers | POC |
| 32 | Task-Technology Fit | POC |
| 32 | LMS (WebCT) Utilization | NOC |
| 33 | Accessing tutorial resources Virtual lectures accessed | POC POC |

but study number thirty-two (32) found that internet self-efficacy has a positive effect on academic performance in the context of e-Learning. Further details on these correlations can be seen on Table 3.

Table 3: Self-efficacy and learning approach

| No | Variable(s) | Result |
|----|--------------------------------------|--------|
| 02 | Improved learning process | POC |
| 02 | Self-Development Outcome | NOC |
| 07 | Collaborative learning | POC |
| 09 | Ability to work independently | POC |
| 09 | Computer self-efficacy | NEC |
| 12 | Level of assistance towards learning | POC |
| 15 | Level of learning assistance | POC |
| 16 | ICT use ability | NOC |
| 16 | Own efficiency estimation | NOC |

| | | |
|----|--|-----|
| 19 | Intrinsic goal orientation | POC |
| 19 | Self-efficacy for SRL | POC |
| 19 | Self-efficacy for e-Learning | POC |
| 19 | Ability to manage one's learning environment | POC |
| 20 | Self-regulated learning strategy | POC |
| 21 | Student learning style | POC |
| 21 | Ability to interact with other students using e-learning | NOC |
| 22 | Self-efficacy for learning and performance | POC |
| 22 | Verbal ability | POC |
| 22 | Internet self-efficacy | NEC |
| 22 | Intrinsic goal orientation | POC |
| 22 | Ability to manage time and studying environment | NOC |
| 24 | Computer self-efficacy | NEC |
| 24 | Locus on control | NEC |
| 25 | Ability to use communication tools | POC |
| 28 | Self-regulatory efficacy (moderate learning environment) | NEC |
| 31 | Using collaborative learning | POC |
| 31 | Self-regulation | POC |
| 32 | Internet self-efficacy | POC |

7.7.4 Motivation and pride

Four (04) studies [16, 21, 25, 31] from this review have studied the impact of motivation and pride on academic performance in the e-Learning context. The four (4) motivation and pride factors identified by these four (4) studies are motivation, student self-motivation, autonomous motivation, and pride. The findings from these studies all agree that motivation and pride have a positive impact on academic performance in the e-Learning context.

7.7.5 Sense of community and interactivity

Seven (7) studies [08, 12, 21, 24, 27, 29, 31] from this review have studied the impact of sense of community and interactivity on academic performance in the e-Learning context. The twenty-three (23) sense of community and interactivity factors identified by these seven (7) studies are presented by Table 5. For example, some of these factors include interactions with instructors, level of assistance towards building social community, and interactivity with peers. The findings from these studies differ on the existence and on the nature of the correlation between sense of community and interactivity, and academic performance in the e-Learning context. For example, paper number twenty-nine (29) found that interactions with instructors do not have any impact on academic

performance in the e-Learning context, but paper number thirty-one (31) found that interactions with instructors have a positive effect on academic performance in the context of e-Learning. Further details on these correlations can be seen on Table 4.

Table 4: Sense of community and interactivity

| No | Variable(s) | Result |
|----|--|--------|
| 08 | Content creation contribution | POC |
| | Number of Chat talk | NOC |
| 12 | Level of assistance towards building social community | POC |
| 21 | Electronic feedback from instructor | POC |
| | Contribution of e-Learning component in the overall Course structure | NOC |
| 24 | Feeling of belongness to a community as a results of the use of CMC | POC |
| | Metacognitive activity | NOC |
| 27 | Creation of negative e-Learning friends | NEC |
| | Creation of positive e-Learning friends | NOC |
| | Creation of neutral e-Learning friends | NOC |
| 29 | Interactions with peers | POC |
| | Interactions with instructor | NOC |
| 31 | Interactivity with peers | POC |
| | Interactivity with instructor | POC |

7.7.6 Perceptions on the suitability of e-Learning

Eleven (11) studies [07, 09, 13, 15, 18, 20, 21, 22, 24, 28, 31] from this review have studied the impact of perceived e-Learning suitability on academic performance. The sixteen (16) perceived e-Learning suitability factors identified by these eleven (11) are presented by appendix A. For example, some of these factors include perceived usefulness of e-Learning and e-Learning satisfaction. The findings from these studies differ on the existence and nature of the correlation between the identified perceptions on the suitability of e-Learning and academic performance. For example, study number seven (7), thirteen (13), twenty-one (21), twenty-four (24), and twenty-eight (28) all agree that e-Learning satisfaction has a positive impact on academic performance, but study number twenty (20) found that e-Learning satisfaction has no impact on academic performance. Further details on these correlations can be seen on Table 5.

Table 5: Perceptions on the suitability of e-Learning

| No | Variable(s) | Result |
|----|--|--------|
| 07 | Students' satisfaction with LMS | POC |
| 09 | Perceived ease of use of e-learning | POC |
| | Perceived usefulness of e-learning | NEC |
| 11 | Perceived compatibility | POC |
| 12 | Level of assistance towards learning | POC |
| 13 | Perceived satisfaction | POC |
| | Perceived convenience | POC |
| | Perceived engagement | POC |
| | Perceived learning | POC |
| 15 | Level of learning assistance | POC |
| 18 | Perceived impact on learning | NOC |
| 20 | Satisfaction with e-Learning system | NOC |
| 21 | Electronic feedback from instructor | POC |
| | User satisfaction | POC |
| | Instructor knowledge and facilitation | NOC |
| 22 | Verbal ability | POC |
| | Help seeking | NEC |
| 24 | Perceptions on the reliability of e-Learning technology | POC |
| | Perceptions on e-Learning technologies ability to support group work | POC |
| | E-Learning Satisfaction | POC |
| | Satisfaction with learning environment | POC |
| 28 | Satisfaction with learning environment | POC |
| 31 | Enjoyment | POC |

7.7.7 New conceptual model

Figure 8 is the new conceptual framework proposed by this literature review of the factors affecting instructors' perceptions on the impact of e-Learning on academic performance, as above presented. All the papers that were reviewed for the design of that framework are referenced on appendix A together with their findings. Having in mind that some of those relationships were not conclusively confirmed by the above presented literature review, it seems important to examine whether or not they can be justified by existing theories.

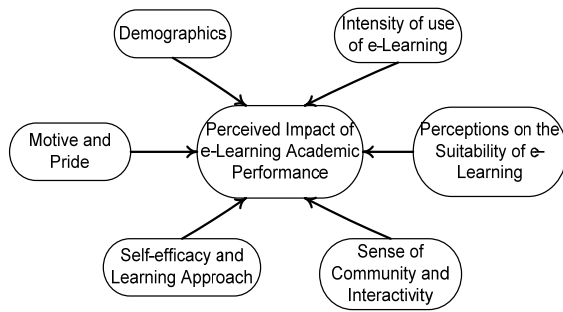


Figure 8: The new conceptual model

The influence of students’ demographics and their intensity of use of e-Learning on their academic performance is supported by the Welberg’s theory of education. Similarly, the influence of students’ motivation and their sense of pride on their academic performance is supported by the self-determination theory. On the other hand, the self-regulated theory is justifying the influence of self-efficacy and learning approach on academic performance. Similarly, the task technology fit theory supports the relationship between student perceptions on the suitability of e-Learning and their academic performance in the e-Learning context. Finally, the social constructivism theory links students’ sense of community and interactivity to their academic performance.

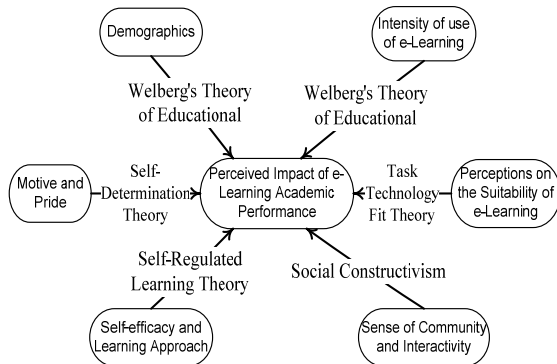


Figure 9: Theoretically sound model of factors affecting academic performance in the e-Learning context

7.7.8 Theoretically sound model of factors affecting academic performance in the e-Learning context

Welberg's theory of educational productivity (1981 and 1984) posits that there are nine factors which contribute to variances in students' cognitive and affective outcomes: ability or prior achievement, age or stage of maturity, motivation or self-concept, amount of time, quality of the instructional experience, the home, the classroom social group, the peer group outside school, and the

use of time outside school. These factors influence one another, and they are also influenced by learner’s academic performance (Welberg, 1984).

According to Kusrkar et al., (2013), the Self-Determination Theory (SDT) advocates that the more self-determined, self-motivated, and self-directed are students, the more improved are their academic performance, their adjustment, and their overall well-being. SDT considers the quality of motivation to be more important than its quantity. As for Black and Deci (2000), SDT suggests that motivated behaviors are either autonomous or controlled.

According to Yu and Jo (2014:269), social constructivism is one the fundamental theories for educational technology, where “learning is a self-developing process by creating or reorganizing a concept or cognitive structure” using learners’ experiences and beliefs. Dagar and Yadav (2016) define social constructivism as an epistemological view of knowledge acquisition, in which social interaction has a central role in the learning process. Social constructivism focuses both on the learning environment and on learners’ ability to self-reflect on subject matters. It proposes that learning happens because of the replication of previous experiences by learners, and because of their cultural, physical, and social settings.

The task-technology fit theory (TTFT) suggests that information systems affect users’ performance depending upon the fit between the users’ task requirements and the functionality of the system (Goodhue and Thompson, 1995). According to Staples and Seddon (2004), TTFT also suggests that the impact on users’ performance depends on the fit between the individual characteristics of the users and the functionality of the system. The bottom line of the task-technology theory is that the performance of a technology and its utilisation directly depend on how it fits with the task at hand.

The self-regulated learning theory (SRLT) implies that learners must possess certain self-regulatory attributes in order to succeed. According to Lee and Lee (2008), in self-regulated learning theory, self-regulated learners are those who take an active responsibility for their own learning and for their academic achievement. Self-regulatory learning is a learner’s intended effort for subject learning. It is a systematic management process regarding one’s own thoughts, emotions, and

behavior for his or her personal goals and achievements (Schunk, 2000). In the SRLT, motivated students display a high level of effort and persistence, they develop a high level of interest in their learning, as well a high level of self-confidence to learn how to achieve their tasks (Schunk, 1986).

8. LIMITATIONS AND CONTRIBUTION OF THE CURRENT STUDY

This new conceptual framework has the merit of being well supported theoretically and it proposes some key factors that affect the academic performance of students and were not mentioned by the four previous above presented reviews. These theories are the Walberg's theory of educational productivity, the self-determination theory, the social constructivism, the task-technology fit theory, and the self-regulated learning theory. These new factors are demographics, intensity of use of e-Learning, self-efficacy and learning approach, sense of community and interactivity, perceptions on the suitability of e-Learning, and motivation and pride.

The proposal of a new theoretically sound conceptual model of academic performance factors in the e-Learning context is the main innovation of this study compared to the four above presented reviews, in addition to the fact that these reviews have a narrow focus. In fact, all the studies reviewed by Broadbent and Poon (2015) are only focusing on self-regulated learning. On the other hand, all the studies reviewed by Lahti et al. (2012) are only focusing on nursing students. However, the fact that this review only made use of free research studies downloadable from the internet can be seen as one of its main limitation.

For those who would like to find out how is this newly proposed model working, the answer is quite simple. This model simply states that, according to the existing literature, the impact of e-Learning on the academic performance of a student is influenced by:

- i) The demographic background of that student
- ii) The intensity of use of e-Learning by that student
- iii) The motivation and pride of that student
- iv) The level of self-efficacy in the learning approach of that student
- v) The sense of community and interactivity of that student, and

vi) The perceptions of that student on the suitability of e-Learning.

This conceptual model may be important for various stakeholders in the high education sector should they want to find out more on the factors that are affecting the impact of e-Learning on academic performance. Researchers may also use this conceptual model for future research on the impact of e-Learning on academic performance. Moreover, researchers who will not read this paper will not be made aware of the latest factors that are affecting academic performance in the context of e-Learning nor of the theoretical foundations of these effects.

Another way of judging the contribution of this paper is by comparing its findings with the findings of the four above reviewed studies. The findings of this study are summarising the academic performance factors in the context of e-Learning into six variables: students' demographic background, their intensity of use of e-Learning, their motivation and pride, their level of self-efficacy in the learning approach, their sense of community and interactivity, and their perceptions on the suitability of e-Learning.

The literature review conducted by Bernard et al. (2004) is not looking at the factors that may affect academic performance in the context of e-Learning, but it is reviewing existing literature on how synchronous and asynchronous distance education and face-to-face learning may have an impact on students' achievement outcomes.

As for Li and Ma (2010), its findings are summarising existing literature on the impact of e-Learning on academic performance. The literature review conducted by Lahti et al., (2014) is not looking at the factors that may affect academic performance in the context of e-Learning, but it summarises existing literature on the impact of e-Learning on students' knowledge level, their learning skills level, and their learning methods' satisfaction.

As for Broadbent and Poon (2015), its findings are summarising the academic performance factors in the context of e-Learning into eleven variables: students' self-regulated learning strategies, their metacognition, their time management, their effort regulation, their peer learning, their elaboration,

their rehearsal, their organization, their critical thinking, and their help seeking abilities.

It is important to compare the conceptual model of this study with existing classical technology adoption models such as the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) whose main focus is on technology acceptance, ease of use, and usefulness. A quick analysis of the conceptual framework of this study shows that its component on the intensity of use of e-Learning includes the technology acceptance factor (see table 2), and its component on perception on the suitability of e-Learning includes the ease of use and usefulness factors (see table 5).

9. RECOMMENDATIONS FOR FUTURE RESEARCH

This review has unearthed evidence from existing literature on the factors affecting instructors' perceptions on the impact of e-Learning on academic performance. Unfortunately, the findings from the reviewed studies differ on the existence and nature of the correlation between e-Learning and most of the identified factors. More research is therefore needed on reasons behind these conflicting results.

10. CONCLUSION

This study has shown that the examination of existing e-Learning literature can be used as a tool for the construction of a conceptual framework of the factors affecting instructors' perceptions on the impact of e-Learning on academic performance. The conceptual model proposed by this study claims that, in the context of e-Learning, students' academic performance is influenced by their demographic profile, their intensity of use of e-Learning, their motivation and pride, their perceptions on the suitability of e-Learning, their sense of community and interactivity, and their self-efficacy and learning approach. This conceptual framework is supported by five theories: The Welberg's theory of education, the self-regulated theory, the self-determination theory, the social constructivism theory, and the task technology fit theory. Nevertheless, more empirical research projects are required in order to test the validity of this framework. More research is also needed on the factors that are identified by certain studies as influencers of academic performance in the e-Learning context while other studies are exhibiting different results on these factors. This

study acknowledges its two main limitations: the use of google scholar as the sole database for the selection of its studies, and the fact that it does not incorporate many studies published between 2016 and 2018.

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APPENDIX A: LIST OF REVIEWED PAPERS

| Study No. | Authors and Year | Findings |
|-----------|--|---|
| 1. | Conijn (2017) | 23 variables such as: Number of online sessions – POC; Number of links viewed – POC; Number of quiz views – POC; Number of wiki views – POC; Largest period of inactivity – NEC; Average time per session – NEC; Irregularity of study interval – NEC; Time until first activity – NEC; Number of discussion posts – NOC; Irregularity of study time – NOC |
| 2. | Fayomi (2015) | Studying through e-learning – POC; Improved learning process – NOC; Self—Development Outcome – NOC |
| 3. | Regueras et al (2009) | Use of QUEST e-Learning tool – POC |
| 4. | Chong (2010) | Use of WBLE e-Learning tool – NEC |
| 5. | Dodd (2009) | On-line distance education experience (compared to traditional distance education experience) – POC |
| 6. | Owinoi (2016) | Hours spent online – POC; Gender – POC; Location setting – POC Subject – POC |
| 7. | Othman (2014) | Collaborative learning – POC; Students' satisfaction with LMS – POC |
| 8. | Zacharis (2015) | 29 variables such as: Reading and posting messages – POC; Content creation contribution – POC; Quiz efforts – POC; Number of files viewed – POC; Number of assignments viewed – NOC; Number of Quizzes viewed – NOC; Number of Chat talk – NOC |
| 9. | Galy et al (2011) | Perceived ease of use of e-Learning – POC; Ability to work independently – POC; Perceived usefulness of e-learning – NEC; Computer self-efficacy – NEC; Age – NEC; Number of online class – NEC; Computer Anxiety – NOC |
| 10. | Al-Saai et al (2011) | Use of blended e-Learning – NOC |
| 11. | Islam (2015) | Perceived compatibility – POM |
| 12. | Islam (2013) | Level of assistance towards learning – POC; Level of assistance towards building social community – POC |
| 13. | Owston et al (2012) | Perceived satisfaction – POC; Perceived convenience – POC Perceived engagement – POC; Perceived learning – POC |
| 14. | Islam (2012) | Level of learning assistance – POC |
| 15. | Castillo-Merino and Serradell-López (2013) | Motivation – POC; Time spent on e-learning – NOC ICT use ability – NOC; Time spent on non-relevant readings – NOC Time spent on relevant readings – NOC; Own efficiency estimation – NOC; Sex – NOC; Age – NOC |
| 16. | Romero and Barbera (2011) | Time Flexibility – POC; Time-on-Task – POC; Working time – NOC; Time of the day – NOC |
| 17. | McGill and Klobas (2008) | Task-technology fit – POC; Perceived impact on learning – NOC |
| 18. | Sharma (2007) | Intrinsic goal orientation – POC; Self-efficacy for SRL – POC; Self-efficacy for e-Learning – POC; Ability to manage one's learning environment – POC |
| 19. | Lee (2009) | Self-regulated learning strategy – POC; Satisfaction with e-Learning system – NOC |
| 20. | Eom (2006) | Student self-motivation – POC; Student learning style – POC; Electronic feedback from instructor – POC; User satisfaction – POC; Instructor knowledge and facilitation – NOC; Ability to interact with other students using e-learning – NOC; Contribution of e-Learning component in the overall Course structure – NOC |
| 21. | Lynch and Dembo (2004) | Self-efficacy for learning and performance – POC; Verbal ability – POC; Help seeking – NEC; Internet self-efficacy – NEC; Intrinsic goal orientation – NOC; Ability to manage time and studying environment – NOC |
| 22. | Bianchi et al (2008) | Use of Mac-CARE – POC |
| 23. | Johnson et al (2009) | Perceptions on the reliability of e-Learning technology – POC; Perceptions on e-Learning technologies ability to support group work – POC; Feeling of belongingness to a community as a result of the use of CMC – POC; Level of interaction with other students using e-learning – POC; E-Learning Satisfaction – POC; Computer self-efficacy – NEC; Locus on control – NEC; Age1 – NOC; Metacognitive activity – NOC |
| 24. | Giesbers et al (2013) | Autonomous motivation – POC; Ability to use communication tools – POC; Web-videoconference participation – POC |

APPENDIX A (CONT'D.): LIST OF REVIEWED PAPERS

| | | |
|-----|-----------------------------------|--|
| 25. | Ladyshevsky (2004) | Use of LearningSpace – POC |
| 26. | Yang and Tang (2003) | Overall grade for all courses – POC; Class participation – POC; Creation of negative e-Learning friends – NEC; Creation of positive e-Learning friends – NOC; Creation of neutral e-Learning friends – NOC; Case based learning – NOC; Forum posting quantity – NOC; Forum posting quality – NOC |
| 27. | Lee and Lee (2008) | Satisfaction with learning environment – POC; Self-regulatory efficacy (moderate learning environment) – NEC |
| 28. | Yu and Jo (2014) | Total studying time in LMS – POC; Regularity of learning interval in LMS – POC; Number of downloads – POC; Interactions with peers – POC; Login frequency in LMS – NOC; Interactions with instructor – NOC |
| 29. | Michinov et al (2010) | Participation in e-Learning – POC; Procrastination to participate in e-Learning – NEC |
| 30. | Al-Rahim and Othman (2013) | Interactivity with peers – POC; Interactivity with the teacher – POC; Engagement with peers and teachers – POC; Using collaborative learning – POC |
| 31. | McGill et al (2008) | Task-Technology Fit – POC; LMS (WebCT) Utilization – NOC |
| 32. | Villavicencio and Bernardo (2013) | Self-regulation – POC; Enjoyment – POC; Pride – POC |
| 33. | Chang (2014) | Internet self-efficacy – POC; Gender1 (Females) – POC |
| 34. | Crampton et al (2012) | Accessing tutorial resources – POC; Virtual lectures accessed – POC |