

UNIVERSITY OF GHANA

**FEEDBACK STRATEGIES AND LEARNING IMPROVEMENT IN SAKAI LEARNING
MANAGEMENT SYSTEM FOR THE DISTANCE LEARNING PROGRAMME AT THE
UNIVERSITY OF GHANA**

BY

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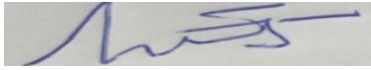
**THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN
PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF DOCTOR
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OCTOBER, 2020

INTEGRI PROCEDAMUS

DECLARATION

I certify that this thesis is original and that it has not been presented to any University whether in part or the whole for the award of any academic degree. All references used in the thesis have been duly acknowledged.

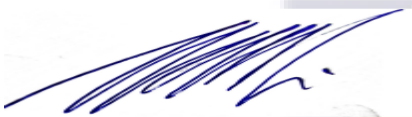


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We, the undersigned supervisors, declare that this is an original work by the candidate and we supervised its production. We are also convinced that the thesis meets all required standards set by the University of Ghana for an award of a Doctor of Philosophy Degree.



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ABSTRACT

A critical support for distance education learners is feedback. Effective feedback provides nurturing and enables adult distance learners to engage with content in the learning environment and among their peers. The purpose of this thesis was to assess and analyse how and which feedback strategies are used to interact with distance education students in a blended learning model using the Sakai Learning Management Systems as the learning context. The first was to investigate students' perception of formative and interactive feedback usage in the Sakai distance learning programme. Second, to find out the nature of feedback in the Sakai online learning environment. The third was to ascertain which demographic characteristics is more likely to influence learning improvement in the online distance learning programme. The fourth was to examine the effects of feedback strategies and embedded feedback syllabus on learning improvement. Using the social constructivists and transactional theories as a framework, the research posited that feedback strategies will predict learning improvement among distance education students in the Sakai learning environment. The philosophical underpinning of the research was pragmatism, through a mixed-methods approach and cross-sectional approach. The population for the study was made up of third year distance education students and their lecturers. For data collection methods, questionnaire, interviews and focused group discussions were adopted. The actual sample size for the survey data was 355 while that of the qualitative was 23 participants for interviews and focused group discussions. The quantitative data set was analysed using frequencies and percentages, logistic regression and multiple regressions. For the qualitative data set, thematic analyses were adopted and presented in narratives. These results were then integrated and the findings discussed. The first objective revealed that students' perception of formative feedback depicted that the level of appreciation of most of the DE students regarding formative feedback was high but interactive feedback was low. The second objective found that the nature of feedback provision is directional, corrective and suggestive more than the use of

dialogue and interaction. Feedback is not personalised as it is targeted at the group. Also, more written feedback is provided than oral and electronic feedback. The study's third objective findings revealed that among the demographic variables examined, age was the only variable that had a statistical significant relationship with learning improvement ($p < 0.05$). The fourth objective showed that all the feedback strategies exhibited a significant positive correlation with students' overall learning improvement. However, embedded online syllabus, and feedback timing showed a relatively stronger correlation with learning improvement than feedback mode, target, quality and quantity. Furthermore, the regression analysis findings indicated that with exception of feedback target, feedback strategies such as timing, mode, quality and quantity related positively with students' overall learning improvement. Other control variables such as Sakai LMS and embedded online syllabus also had positive statistical significant relationship with learning improvement ($p < 0.05$). The regression analysis findings further showed that merging of feedback strategies with the embedded online syllabus in linear multiple regression models had higher predictive power on students' overall learning improvement than the use of only feedback strategies in predicting students' overall learning improvement. Overall, the study concludes that feedback strategies when it is well managed and applied by DE lecturers in Ghana would make a huge impact on DE students' academic pursuit.

Keywords: Sakai learning management system, feedback, feedback strategies, embedded course syllabus, distance education students, learning improvement, higher education, Ghana



DEDICATION

I dedicate this thesis to the Almighty God and to my family for inspiring me on to success.



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TABLE OF CONTENT

DECLARATION	ii
ABSTRACT.....	iii
DEDICATION.....	v
ACKNOWLEDGEMENTS.....	vi
TABLE OF CONTENT.....	vii
LIST OF TABLES.....	xi
LIST OF FIGURES.....	xii
LIST OF ABBREVIATIONS.....	xiii
CHAPTER ONE.....	1
INTRODUCTION.....	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem.....	5
1.3 Purpose of the Research.....	8
1.4 Specific Objectives of the Research.....	8
1.5 Research Hypotheses.....	9
1.6 Significance of the Study.....	10
1.7 Definition of Terms.....	11
1.8 Organisation of the rest of the Study.....	12
CHAPTER TWO.....	14
LITERATURE REVIEW.....	14
2.1 Introduction.....	14
2.2 Theoretical Framework.....	14
2.2.1 Constructivists Theory of Learning.....	14
2.2.2 Transactional Distance Theory (TDT).....	18
2.3 Learning Management System and its usefulness in Education.....	21
2.3.1 What is a Learning Management System (LMS)?.....	21
2.3.2 Usefulness of Learning Management Systems.....	23
2.3.3 Features of LMSs.....	24
2.3.4 Factors that impact the use of LMS among Students.....	25
2.4 Feedback in Learning.....	26
2.4.1 Importance of Feedback to Students.....	30
2.4.2 Feedback, Reflectivity, and Curriculum Design.....	31
2.4.3 The Nature of Feedback in Learning Environments.....	32
2.4.4 Formative Feedback.....	34

2.4.5 Challenges to providing Formative Feedback.....	35
2.4.6 Feedback Strategies.....	37
2.4.7 Factors influencing the use of Feedback.....	39
2.4.8 Frameworks used to provide Feedback in Technological Environments	39
2.5 Proposed Conceptual Framework	43
2.6 Summary of Literature Review	46
CHAPTER THREE	48
METHODOLOGY	48
3.1 Introduction	48
3.2 Study Setting: The Distance Learning Programme at the University of Ghana	48
3.2.1 The Sakai Online Distance Learning Environment.....	49
3.2.2 The learning context.....	49
3.3 Philosophical Underpinning of the Researcher.....	50
3.4 Research Approach	52
3.5 Quantitative Research Design	54
3.6 Qualitative Research Design	55
3.7 Population.....	56
3.7.1 Target Population	57
3.7.2 Sample Size Determination.....	58
3.7.3 Sampling Techniques	60
3.8 Instrumentation.....	63
3.8.1 Pilot Study.....	64
3.8.2 Post-Test.....	65
3.9 Actual Data Collection Procedure.....	67
3.9.1 Cleaning the Data and Addressing Missing Data.....	69
3.9.2 Normality Test.....	70
3.10 Regression Model Specification.....	73
3.10.1 Estimation Technique.....	73
3.10.2 Multiple Regression Model for Feedback strategies and learning improvement.....	73
3.11 Credibility.....	75
3.11.1 Trust Worthiness	75
3.12 Reliability.....	77
3.13 Common Method Bias	81
3.14 Exploratory Factor Analysis.....	81
3.15 Validity.....	84

3.15.1 Convergent and Discriminant Analysis	84
3.16 Data Analysis Methods	85
3.17 Ethical Considerations.....	87
3.18 Summary of Chapter	88
CHAPTER FOUR.....	89
PRESENTATION AND ANALYSIS OF RESULTS	89
4.0 Introduction	89
4.1 Personal Information and Demographics	89
4.2 Descriptive Statistics	92
4.3 Research Objectives	97
4.3.5 Pearson’s Product Moment Correlation Analysis	102
4.3.6 Objective four: Effects of feedback strategies on learning improvement.....	105
4.3.7 Regression Analysis	105
4.4 Second Phase: Analysis of Qualitative Results.....	110
4.4.1 Characteristics of the Participants	110
4.4.2 Thematic analysis.....	111
4.4.3 Understanding of feedback.....	112
4.4.4 Feedback as Insight	113
4.4.5 Feedback as evaluation.....	115
4.4.6 Nature of Feedback	116
4.4.7 Directive or Directional Feedback	116
4.4.8 Suggestive Feedback	117
4.4.8 Feedback Target.....	119
4.4.9 Feedback Form.....	122
4.4.10 Benefits and usefulness of Feedback	123
4.4.11 Feedback that improves learning.....	123
4.4.12 Motivating Feedback.....	125
4.4.13 Goal Direction	127
4.4.14 Challenges of giving and responding to feedback	129
4.4.15 Work Overload.....	129
4.4.16 Untimely and delayed feedback	130
4.4.17 Lack of resources in Sakai LMS usage	131
4.4.18 Tools used in Sakai LMS	132
4.4.19 Assignment/tests and quizzes.....	133
4.4.20 Polls Tool Usage for assessment.....	133

4.4.21 Use of Chatroom	134
4.4.22 Use of Forum.....	136
4.4.23 Chapter Summary.....	140
CHAPTER FIVE	142
DISCUSSION OF FINDINGS	142
5.1 Introduction	142
5.2 Demographic Characteristics of Respondents.....	143
5.3 Students’ perception of formative and interactive feedback used in online learning – Objective 1	144
5.4 Discussion of objective 3 based on Nature of Feedback.....	147
5.5 Discussion of objective three based on Logistic Regression	149
5.6 Discussion Based on Pearson’s Correlation Results	152
5.7 Discussion of objective four based on Regression Findings.....	154
5.8 Discussion based on qualitative findings	159
5.9 Chapter Summary.....	163
CHAPTER SIX.....	165
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	165
6.1 Introduction	165
6.2 Summary of the Study.....	165
6.3 Key Findings from the study.....	167
6.4 Conclusions	171
6.5 Contribution to knowledge.....	168
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6.6 Implications.....	177
6.7 Recommendations	177
6.8 Suggestion for Future Research	180
REFERENCES	181
APPENDICES	216
APPENDIX A: Questionnaire	216
APPENDIX B: The Krejcie & Morgan (1970) Sample Size Determinant.....	221
APPENDIX C: Summary of Interview and FGD participants Demographic Data	222
APPENDIX D: Ethical Clearance from University of Ghana	223
APPENDIX E: MISSING DATA FOR LMS.....	224
APPENDIX F: Common Method Bias of items	228
APPENDIX G: Methodological Framework for Feedback Strategies	230

LIST OF TABLES

Table 3. 1: Determination of Sample Size to use for the Quantitative Study	60
Table 3. 2: Cronbach Alpha Reliability Scores for Pilot	67
Table 3.3(a): Normality Test for Sakai Management System, Embedded Syllabus, and Feedback Strategy	71
Table 3. 4: Reliability for Sakai Learning Management.....	77
Table 3. 5: Reliability of Feedback Embedded Course Syllabus.....	78
Table 3. 6: Nature of Feedback.....	78
Table 3. 7: Feedback Strategies	79
Table 3. 8: Learning Improvement	80
Table 3. 9: Rotated Matrix Sakai Learning Management.....	81
Table 3. 10: Rotated Matrix for Embedded, Nature, Strategy, and Learning Improvement	82
Table 3. 11: Rotated Matrix for Learning Improvement	83
Table 3.12: CR, AVE, and Inter-factor Correlation (Convergent and Discriminant Validity)	85
Table 4. 1: Demographic Characteristics.....	90
Table 4. 2: Descriptive Statistics for Sakai Learning Management.....	93
Table 4. 3: Descriptive Statistics for Embedded Syllabus.....	94
Table 4. 4: Descriptive Statistics for Feedback Strategies.....	95
Table 4. 5: Descriptive Statistics for Nature of Feedback	96
Table 4. 6: Descriptive Statistics for Students Perceptions	97
Table 4. 7: Nature of Feedback between Lecturers and Students.....	98
Table 4.8: Logistic Regression output for Distance Education Students’ Learning improvement	100
Table 4. 9: Evaluation of logistic regression model fit (Goodness of fit).....	101
Table 4. 10: Evaluation of model fit (Goodness of fit).....	104
Table 4.11: Regression output for feedback Strategies and Students’ Learning Improvement	103
Error! Bookmark not defined.	
Table 4. 12: Test for Multicollinearit.....	105
Error! Bookmark not defined.	
Table 4. 13: Summary of Hypotheses.....	109

LIST OF FIGURES

Figure 2. 1: Learner moves from ZAD to ZPoD through ZPD - Lecturers and Peers feedback

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Figure 2. 2: Conceptual Framework for Feedback Strategies and Learning improvement 44



LIST OF ABBREVIATIONS

ANOVA	-	Analysis of Variance
AVE	-	Average Variance Extracted
BA	-	Bachelor of Arts
BSC ADMIN	-	Bachelor of Science in Business Administration
BSC CSIT	-	Bachelor of Science in Computer Science and Information Technology
BSC NURS	-	Bachelor of Science in Nursing
CFL	-	Challenge-Feedback Learning
CMS	-	Content Management System(s)
COVID-19	-	Coronavirus 2019
DE	-	Distance Education
EFA	-	Exploratory Factor Analysis
EMS	-	Embedded Course Syllabus
FGDs	-	Focused Group Discussions
FNLI	-	Feedback and Learning Improvement
FSU	-	Feedback Strategies Used
FSUM	-	Feedback Strategies used (Mode)
FSUT	-	Feedback Strategies used (Timing)
FSUTG	-	Feedback Strategies used (Target)
FSUTQ	-	Feedback Strategies used (Quality/Quantity)
ICT	-	Information and Communication Technology
INFOTECH	-	Information Technology
KEWL	-	Knowledge Environment for WebBased Learning
KNUST	-	Kwame Nkrumah University of Science and Technology
KPI	-	Key Performance Indicators
LMS	-	Learning Management System(s)
LR	-	Lecturer
MAR	-	Missing at Random
MCAR	-	Missing Completely at Random
MMR	-	Mixed Methods Research

NAB	-	National Accreditation Board
NCTE	-	National Council for Tertiary Education
NMAR	-	Non-missing at Random
NoF	-	Nature of Feedback
ST	-	Student
TDT	-	Transactional Distance Theory
UG	-	University of Ghana
UGDE	-	University of Ghana Distance Education
USA	-	United States of America
USLMS	-	Usage of Sakai Learning Management System



CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Feedback enables teachers and students to improve upon their performance. Useful feedback regards the best way of communicating to learners what they have achieved and what they need to work on next. Feedback is nurturing. It is about stimulating or exciting students for them to reflect on the content and become goal-directed. Feedback is vital in learning, especially in distance education, because it can help interaction between instructors and learners. Interaction between instruction and learning is essential for critical reasoning and deep learning in distance education (Tagoe & Cole, 2020). Therefore, feedback strategies can enhance interaction and exchange of information between lecturers, students, and peers.

From the global perspective, feedback has been touted as essential to learning success. For example, in the USA, tasks, self-assessments, peer appraisals, and periodic assignments with instantaneous feedback are effective strategies and a key factor in online and distance education (Gaytan & McEwen, 2007). Studies from Europe such as, Nicol and Macfarlane-Dick (2006, p.205) proposed “principles of good feedback practice that engender student self-regulation and learning improvement”. Similarly, Ypsilandis (2002) argued that feedback is acknowledged as an assistance mechanism, a key factor for successful learning. Thus, feedback is understood as an interaction between learners (peers), or generated by the learner him/herself. Also, in an Australian study it was found that feedback encouraged peer engagement and subsequently improved students learning (Moore & Teather, 2013). From the African perspective, most of the literature is situated in the South African context. For example, Ngwenya (2019) explained that large class sizes prevented effective feedback provision to students. Formative assessment and feedback provides

distance education students in Ghana with an opportunity to better and to appreciate the gap between their present and anticipated performance (Amoako, 2018). Also, the strategy or mechanism utilised to provide online feedback has an effect on students' learning (Boateng et al., 2019) and that feedback must be prompt in distance education (Quansah et al., 2017) to help student achieve better performance.

Thus, feedback is valuable when it informs the student's direction to enhance student self-regulation (Brookhart, 2008; Margaret Price et al., 2010). This feedback strategy improves student learning and academic performance. Challenging feedback also leads to reflective thinking (Sternad, 2015) and critical for distance education students. Although Learning Management Systems (LMSs) aid interaction between stakeholders in the learning environment, researchers are silent on the role that feedback plays in this interaction (Cavus, 2015). Badu-Nyarko and Amponsah (2016) argued that feedback provision is a challenge, leading to 75.5% of students' dissatisfaction with tutorial feedback than any other teaching and learning activity. A related study conducted in Hong Kong by Espasa et al. (2018) reported a lack of understanding regarding feedback by both learners and instructors in higher education. However, with the advent of online or blended learning discussions, tools such as a chatroom, forum, or video meeting are enabled. These tools can facilitate rich feedback experience for lecturers and learners. Respondents intimated in a post-graduate hybrid class that selecting the right tools in an LMS enables quick feedback that enhances student-lecturer participation (Asamoah & Oheneba-Sakyi, 2017).

Feedback is critical for adults in distance education who may be re-joining the education stream to enhance their economic lives and, especially, for women returning to school because they can now afford it (Biao, 2012; Kentnor, 2015; Kwapong, 2008). Feedback can help these students immensely to integrate the learning content and self-direct their goals. Again, the students' needs are changing. They now require flexible learning schedules, student-centred learning, coupled with

the lecturer or teacher's changing role from lecturing or teaching to that of a facilitator (Cavus, 2015). Due to students' changing needs, technology-based approaches to teaching and learning are now used to provide distance education and to meet students learning needs (Glennie & Mays, 2019; Hicks et al., 2001; Williams, 2002)

The development of technology has also improved the provision of distance education in higher education institutions globally (Biney, 2019). Distance education provision in the USA rose from 25.9% in 2012 to 29.7% in 2015 (Seaman et al., 2018). Trines (2018) reported that seven million students are pursuing open and distance education or digital learning in Bangladesh, India, Iran, Pakistan, South Africa, and Turkey. Digital learning is a combination of delivering content through technology. The teacher facilitates the process despite the place, path, or time and students setting their own pace to learn (Davis, 2020). The trend in education technology has helped to interact through Learning Management Systems (LMSs) and Content Management Systems (CMSs). These software have been used extensively in universities and colleges in the United States of America (USA), Europe, recently in Asia and Africa (Dahlstrom et al., 2014; Kigundu, 2014; Larbi-Apau et al., 2017; Rucker & Frass, 2017; Unwin et al., 2010). Using LMS for teaching and learning has also been touted as the quickest way for students to be involved in their studies according to Ramírez-Correa et al. (2015) because of the ubiquity of smartphones and Internet availability. Involvement implies interacting with information and activities between students and peers and between their lecturers through feedback.

Some of the opportunities that technology offers include the uploading of course syllabus, learning resources, and assessing students' performance (Williams, 2002). Performance assessment could be formative or summative or both. Formative assessment provides an opportunity for the instructor to correct or direct learners to build on information and knowledge acquired (Biggs, 1999). On the other hand, the summative assessment focuses more on scores and grading (Aoun

et al., 2018). Also, computer-mediated learning tools and learning management systems have facilitated the provision of blended learning that is flexible (Azizan, 2010; Bocconi & Trentin, 2014; Garrison & Kanuka, 2004). Garrison and Kanuka (2004) describe blended learning as a combination of classroom learning with technology use. This blended learning environment allows students to pace their studies according to their needs as well as to receive personalised learning. Some suggest that blended learning affords learners a work-life balance and enables them to achieve their academic goals (Al-Husban & Shorman, 2020). Blended learning appears to be a preferred option for learners who cannot afford to be in a traditional class setting due to work schedules. In some African countries, such as in Botswana and South Africa, blended learning is the preferred option as students have to combine work and school (Karsenti et al., 2010), which is not different in the Ghanaian educational landscape. Therefore, the Internet has enabled the use of Learning Management Systems (LMSs) to support both distance education and face-to-face teaching and learning (Karsenti et al., 2010). Indeed, distance and digital learning will continue to expand in sub-Saharan Africa (Trines, 2018). Thus, using effective feedback strategies in this learning space can yield high interaction between lecturers and students through technology, either synchronously or asynchronously, to foster active learning.

It is worth noting that reflective thinking is a crucial learning experience for both males and females in adult education. Butakor (2016) also, argued that feedback could lead to higher-order thinking among students. So how students engage in reflexivity and self-directedness is essential for this research. In this regard, Crimmins et al. (2016) used written, reflective and dialogic feedback to conduct a study on first-year students in Australia, which revealed that students highly value feedback in a face-to-face learning setting. Learning styles also differ among genders; hence, it is crucial to explore how students' demographic characteristics affect their response to feedback in LMSs environment. For instance, women prefer learner-focused approaches, talking about class topics, and working in groups while men are better individual learners (Kwamong, 2008). Further,

distance female students also show a likeness for connecting with other learners in the learning environment.

Indeed, LMSs have become and will continue to be an integral part of education. Therefore, its use will continue to influence the teaching and learning environment globally. The question is, how is feedback assured in an online environment from the Ghanaian perspective? Are instructors who use LMSs enhance self-regulation or self-direction of adult learners such as DE students through the feedback they provide? These questions require considerable research. Since few studies have reported the influence of feedback strategies in LMSs and how students use this feedback to improve learning, this study focused on the phenomenon among students pursuing distance education in higher education at the University of Ghana.

1.2 Statement of the Problem

Feedback is the outcome that students receive on the tasks they produce. Thus, students need insight into feedback that focuses on developing students' capacity to produce the needed reactions to their tasks (Sadler, 2010). Inadequate and inappropriate feedbacks are cited as some key contributing factors that could negatively affect learners' academic performance in a rapidly growing learning environment (Brown, 2015; Hsia et al., 2016; Kocaleva et al., 2015; Ng & Ishak, 2018).

Consistently, many studies carried out in various pedagogical cycles were limited to the mainstream students' academic performance in general (Andres, 2017; Larbi-Apau et al., 2017; Williams, 2002). Besides, most of the studies assessed students' performance, focusing on classroom-based assessment (Bird & Yucel, 2015; Cramp, 2011; Joncas et al., 2018).

Distance and online learning approaches have caught up in recent times in other parts of the world such as in the USA (Allen & Seaman, 2011). Also, some Ghanaian universities that offer distance

or blended learning to increase formal instruction to yearning communities have bought into the emerging online teaching and learning technology (Badu-Nyarko et al., 2017). Although not as pervasive as what is happening in the advanced countries, tertiary institutions are innovatively using LMSs to provide blended learning for those who prefer distance learning in some Ghanaian universities (Asamoah & Oheneba-Sakyi, 2017). These universities include but are not limited to the University of Ghana, University of Cape Coast, Kwame Nkrumah University of Science and Technology, and the University of Education, Winneba. Blended modules imply that universities in Ghana are adopting global practices, which might position them to be competitive and remain relevant in the education industry. Importantly, providing diverse pedagogical learning approaches in higher education institutions is a requirement of the National Accreditation Board (2018).

Based on the observations of earlier studies relating to online learning approaches, much of these studies have focused on online learning methods in the western context such as those of (Bird and Yucel, 2015; Boud and Molloy, 2013; Espasa et al., 2018) creating a knowledge gap in Africa, specifically in the Ghanaian education context. However, the literature has shown that little attention is given to the ramifications of the emerging trend of online learning in the research community. In Ghana, few studies like those of Asamoah (2020), Asunka (2008), Boateng et al. (2016) and Tagoe (2013) have attempted to investigate students' understanding, experiences, and perceptions of online learning in higher education perspective. Unwin et al. (2010) and Trines (2018) examined the myths and realities and the rise of digital and online learning to confirm which of the learning tools is adaptable and delivering online learning to the African continent's masses. Meanwhile, Ghana's effort to catch up with online teaching and learning technology to ensure that the current educational system is made flexible and accessible is below average (Tagoe, 2013); except in recent times where COVID-19 has virtually forced institutions to use technology (e-learning) for teaching and learning. It is acknowledged by Espasa et al. (2018) that students' ability

to engage with the lecturer or fellow students through online resources for adequate comments or feedback could lead to improved learning.

However, the study of Asamoah (2020) reports that most university lecturers are not prepared to utilise online teaching, while many students are not ready to frequent online learning management systems due to their deficiency in ICT skills. This challenge has slowed the free flow of academic feedback information between the instructor and the online learner and needs to be explored (Budu & Ackah, 2016). In an attempt to examine the effects of the adoption of online LMSs usage on students' academic progress in distance education, several studies have been carried out in the USA, Europe, and Asia (Angelova & Zhao, 2016; Hsia et al., 2016; Lipnevich et al., 2016; Sung et al., 2016).

Noticeably, only a few studies in Ghana were devoted to online LMSs utilisations and their influence on learning outcomes. For instance, the study of Asamoah (2020) focused on reflections in Sakai/Moodle learning management, using demand and supply analysis in Ghanaian universities, while Asunka (2008) limited his study to online learning in higher education in Sub-Saharan Africa, using Ghanaian university students' experiences and perceptions as a case. A recent study conducted by Tagoe and Cole (2020) was on how LMSs could alter the way students learned at DE but, it focused on nursing students only who are not the only adult learners in the University of Ghana distance learning programme. On the other hand, whereas the study of Tagoe (2013) looked at incorporating e-learning into teaching and learning at the University of Ghana based on faculties perception, Budu and Ackah (2016) sought to assess challenges that affect the implementation of e-learning in Ghanaian tertiary institutions. Even though the study of Asamoah and Oheneba-Sakyi (2017) focused on Masters' students in the blended model, the phenomenon of feedback was mentioned only once in that study.

A keen assessment of the few prior studies carried out in Ghana on online learning showed a huge gap that needs to be filled. The common gaps identified had to do with the fact that most of the studies engaged in universities' generalization without focusing on distance education – knowledge gap. Again, demographic characteristics of students' age, the centre of learning, the programme of study, and employment status have not been thoroughly investigated. Besides, the role of feedback strategies in determining students' learning outcomes was not explored in these studies – context gap. Contextually, the study focuses on how feedback types improve learning among distance education students in the blended learning environment. Also, the Ghanaian studies focused on quantitative and qualitative methodologies.

Therefore, in an attempt to fill these knowledge, contextual and methodological gaps, this study sought to address the question, which feedback strategies are used in online learning, and how do they influence learning improvement using the Sakai LMS for the Distance Learning Programme at the University of Ghana?

1.3 Purpose of the Research

The purpose of this study was to assess the use of feedback strategies for learning improvement in a blended (online and face-to-face) teaching and learning environment and to explore how interactive feedback embedded course syllabus influences the learning improvement of distance students at the University of Ghana.

1.4 Specific Objectives of the Research

To find answers to the problem above, the current study sought to:

1. Investigate students' perception of formative and interactive feedback usage in the distance learning programme.

2. Find out the nature of feedback and how it improves online interaction between lecturers and students.
3. Ascertain which demographic characteristics (sex, age, study centre and programme of study) were more likely to influence learning improvement in the online distance programme.
4. Examine the effects of feedback strategies (timing, mode, target, quantity, and quality) learning improvement.
5. Examine the effect of embedded feedback course syllabus on learning improvement.

The following research questions were posed and answered to support the study's qualitative aspect based on these objectives.

1. What were the feedback experiences of distance students in the Sakai online learning?
2. What was the nature of feedback used in the Sakai online learning environment?
3. What were the benefits and issues that confront students and lecturers in giving and receiving feedback in the online learning programme?

1.5 Research Hypotheses

Based on the research objectives and the review of the literature, the following working research hypotheses were tested.

1. **H₀₁:** Learning improvement of distance education students does not statistically significantly affect students' demographic characteristics (sex, age, the programme of study, and study centre).

H_{A1}: Learning improvement of distance education students is statistically significantly affected by students' demographic characteristics (sex, age, the programme of study, and study centre).

2. **Ho2:** Feedback strategies (i.e., timing, mode, target, quantity, and quality) have no statistical significant influence on learning improvement.

HA2: Feedback strategies have a statistical significant influence on learning improvement.

3. **Ho3:** Embedded course syllabus has no statistical significant effect on learning improvement

HA3: Embedded course syllabus has a statistical significant effect on learning improvement

1.6 Significance of the Study

Conducting the study is significant within the context of the ICT development plan in Ghana, aiming to provide a wide range of contact and virtual/online education to students (Ministry of Education, Ghana, 2015). Thus, the research sought to provide a deeper understanding about feedback strategies as they are used within the Sakai LMS environment. It was also to establish how feedback strategies enhance students' self-direction and learning improvement in a Ghanaian blended higher distance education context.

This study is one of the few studies on feedback strategies provided within Ghana's online teaching and learning context. The research findings provide empirical evidence on how students are provided feedback and questions the relationship between feedback strategies used in the online teaching and learning environment and improvement in learning. Thus, facilitators, faculty members, or instructors can approach using the feedback strategies more carefully considering the age of online distance education students.

The literature suggests that teaching content must be embedded with feedback to allow learners to interrogate and engage with that content. Therefore, the study tried to unearth the quality of feedback content uploaded on Sakai LMS at the UG for distance learning and confirm whether it is aiding collaboration and interactions between students and lecturers and between students and students. This is important because a well-designed content (course syllabus) should culminate in

knowledge creation and critical thinking skills so that graduates can go out to influence organizations.

The African Union Commission Agenda 2063, of which Ghana is a member, has focused on expanding and improving education technology, innovation, and ICT policies for education institutions in Africa (Africa Union Commission, 2015). Since there is interest in blended teaching and learning modules in Ghanaian universities, this research's findings provide policymakers some guidelines to develop a feedback framework that can enhance students' self-directedness and learning improvement on the African continent.

1.7 Definition of Terms

1.7.1 Feedback

For this research, feedback means lecturers provide the opportunity to students utilizing written comments to know what they have done via interactive tools in the Sakai LMS to think critically and better produce schoolwork. In other words, it empowers them to make their own opinions about learning issues within the learning environment.

1.7.2 Feedback Strategies

Feedback strategies are the deployment of skills in providing lecturers comments to enable students to engage with pedagogical content through directional, dialogic, or suggestive means. It can be the use of oral, written, or electronic comments. The strategy can target the individual or group. It can be using a few or elaborate words based on the type of assignment given. It can also be based on the timing of the comment provided. These culminate in self-direction and goal-oriented behaviour in students.

1.7.3 Distance Education/Learning at University of Ghana

This means providing education to students who are not in residence at the University of Ghana, but are connected through the Sakai LMS use. Also, students meet for tutorials three times for each course in a semester. Students take a mid-semester examination as well as the end of semester examinations at designated centres across ten regions of Ghana.

1.7.4 Learning Improvement

The utilisation of effective feedback strategies leads to students achieving their learning goals. In other words, inspired, motivated and goal-directed feedback leads to learning improvement among students.

1.7.4 Feedback Embedded Course Syllabus

Embedded course syllabus is incorporating or integrating feedback mechanisms in the course syllabus to show clearly how feedback is to be given by lecturers to guide and encourage students to make use of feedback.

1.8 Organisation of the Study

Chapter one is the introduction to the thesis. It contains the background, problem statement, the purpose of the study, the specific objectives, hypotheses, the study's significance, and definition of terms used for the research. Chapter two comprises the theoretical and empirical literature. The theoretical review provides information on constructivism, transactional distance theories, and frameworks for providing feedback in the teaching and learning process. The empirical review focused on related studies on feedback in LMSs or online settings in different parts of the world. There is also the proposed conceptual framework for the study. Chapter three presents the methodology of the study. It involved the philosophy, research design, population of the study, target population, sample size, sampling technique, instrumentation, data collection procedures and cleaning of the data, credibility, trustworthiness, reliability, validity, data analysis and ethical consideration. Chapter four includes the presentation of results and interpretation of data. Chapter

five covers the discussion of findings, while Chapter six contains the summary, conclusion, recommendations, implications, limitations, and suggestions for further studies.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review is divided into two sections – theoretical framework and related literature review. Under the related literature the following sub-topics were reviewed - learning management systems and their usefulness in education; feedback in learning; importance of feedback to students; feedback, reflectivity and curriculum design; the nature of feedback; formative feedback; the challenges of formative feedback. The others include feedback strategies; the factors that influence feedback; frameworks used to provide feedback in technological environments; learning improvement; the proposed conceptual framework and finally, a summary of the chapter.

Section A: Theoretical Review

2.2 Theories underpinning the research

Two interrelated theories underpinned the research. These were the social constructivist theory and the transactional distance theory because these theories lean on interaction, collaboration, dialogue, and structure within a learning environment. A review of these theories is provided below.

2.2.1 Constructivists Theory of Learning

In a practical learning setting, both students and instructors or facilitators are involved in the desired outcomes activities. Involvement means interacting with each other in the learning environment (Woo & Reeves, 2007).

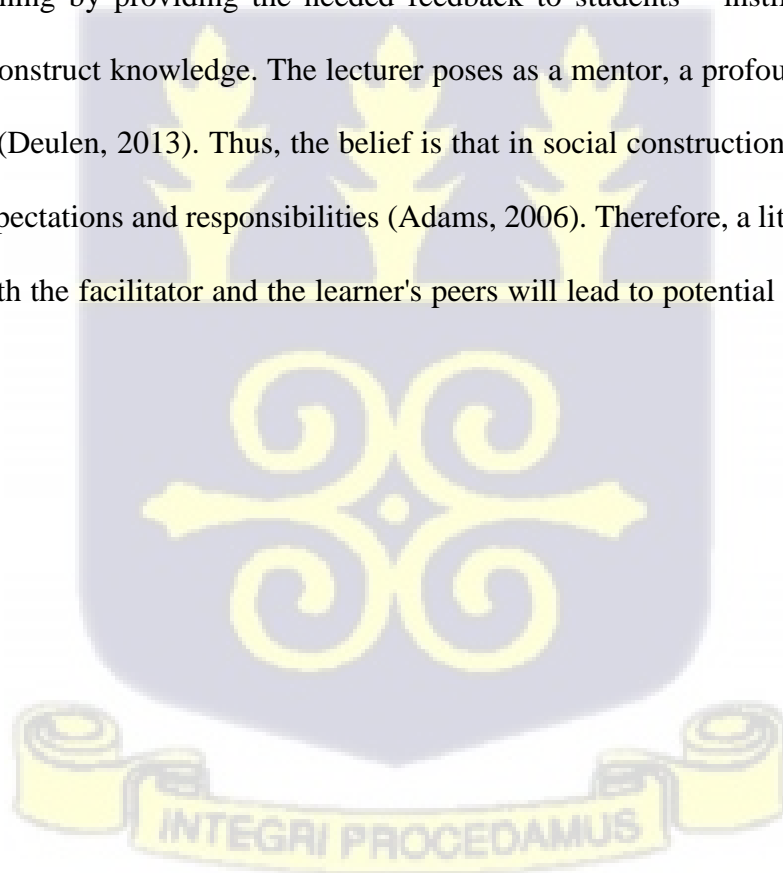
The concept of interactive learning is referred to as a constructivist approach of learning and they describe "strategies, tools and practices" that are important for effective learning (Powell & Kalina,

2009, p. 249). Constructivist elements for learning originated from Piaget (1953) that is, cognitive constructivism and Vygotsky (1962, 1978) that is, social constructivism (Liu & Chen, 2010; Powell & Kalina, 2009). Cognitive and social constructivism are used to achieve effective learning outcomes (Powell & Kalina, 2009). In constructivist environments, teacher reflectivity in practice encourages students to constantly evaluate their understanding of learning (Bada, 2015). Furthermore, in a constructivist learning context, the syllabus is holistically broken down into observable learning patterns, the focus is on exciting students' curiosity; provision of basic materials, as well as those that allow students to explore ideas further; learning is engaging based on students' knowledge; teaching and learning dialogically encourages students to co-construct; the role of the teacher is that of facilitation; assessment is both formative and summative; the experiences gained in the learning environment leads to more knowledge creation, and group work is a primary focus (Bada, 2015).

Such constructivist elements lead to new ways of learning among students. In other words, using feedback strategies in online learning should be embedded in the course syllabus to provide students with the ability to socially construct their own knowledge as well as with their peers. Modern LMSs allow interaction and collaboration between and among learners, which in itself is a motivation for giving and receiving good feedback. Again, the propensity to engage in reflective learning as students receive feedback from all relevant stakeholders is likely to lead to improved learning. The ability to interact is a characteristic of a social constructivist environment where diversity is embraced for the purpose of learning (Powell & Kalina, 2009). Thus, students help each other with the curriculum and content with the teacher facilitating the process.

The three concepts of social constructivism by Vygotsky (1978) cited in Deulen (2013, p. 91) are: *the zone of actual development* (where the student actually and currently is developmental); *the zone of potential development* (where the student potentially should or could be); and *the zone of*

proximal development (the amount of assistance required for a student to move from the zone of actual development to the zone of potential development). To expatiate, the proximal development zone is where the lecturer or instructor becomes the mediator or middleman for the learner's potential development (Vygotsky, 1978), implying that the middle man is the mentor helping the learner develop. Lowe and Lowe (2010) described the social constructivist environment as an ecosystem and argued that an ecosystem should be healthy enough to allow interconnected relationships. In their view, an ecosystem ensures that all the living organisms of the system look out for each other for survival. Thus in a social constructivist environment, interconnected relationships are crucial for learning to take place. Social constructivism is also viewed as a "collectivist model," where the learning space is one of a community (Deulen, 2013, p. 93). The Sakai learning environment should thus be one that upholds community, with the lecturers facilitating learning by providing the needed feedback to students – instilling content for the learners to co-construct knowledge. The lecturer poses as a mentor, a profound concept of social constructivism (Deulen, 2013). Thus, the belief is that in social constructionism, the learners are aware of the expectations and responsibilities (Adams, 2006). Therefore, a little guidance through feedback by both the facilitator and the learner's peers will lead to potential achievement. Figure 2.1 illustrates.



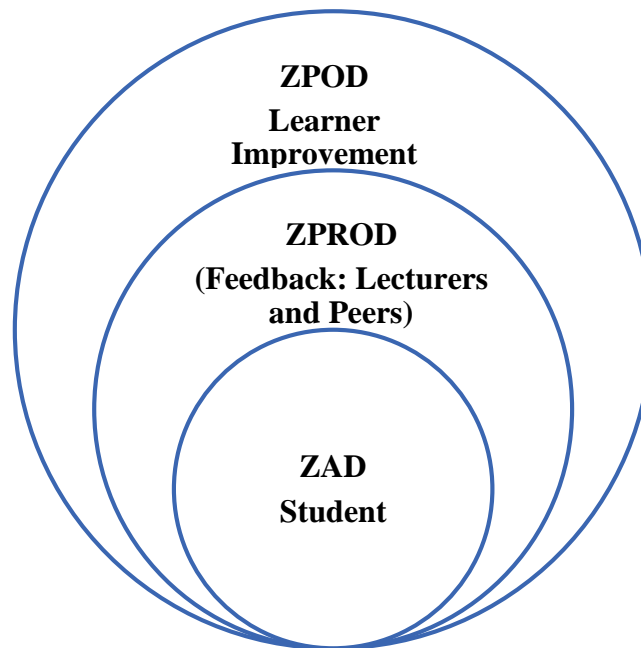


Figure 2. 1: Learner moves from ZAD to ZPoD through ZProD – Lecturers’ and Peers’ feedback (Author’s conception)

Where ZAD is zone of actual development; ZPoD is zone of potential development and ZProD is zone of proximal development.

Even though social constructivism touts interactive learning and co-construction of knowledge, it has been criticised by some schools of thought. For instance, Philips (1995) in his book “the good, the bad and the ugly”, argued that social constructivist theory of learning tended to emphasise epistemological relativism. In a related argument, Fox (2001) stated that social constructivist theory of learning lays too much emphasis on active participation, dismissing to role of passive perception. Others also believe that social constructivist theories of learning tend to promote group thinking while ignoring personalised learning (Alanazi, 2016). Since facilitation is important interaction and co-construction of knowledge, social constructivism is upheld for this study.

2.2.2 Transactional Distance Theory (TDT)

The Transactional Distance Theory (TDT) has been used in several studies in educational cycles, particularly in the distance and online education (Al-Harthi, 2010; Chen, 2001; Tait, 2017). Moore, in the 1970s, propounded the theory (Moore, 1972). The TDT is considered one of the best pedagogical theories that propose technology-based teaching and learning, contrary to other theories that focus on classroom teaching and learning (Moore & Kearsley, 2012). Alotibi and Miller (2019) explained that TDT's assumptions are generally linked to distance education's social aspect in the distance education literature.

In defining transactional distance, Moore (1991) elucidated that it is a psychological space of potential misunderstandings between instructors' behaviours and those of the learners. However, a series of clarifications regarding transactional distance has been made by Moore (1993) and Saba (2002) emphasising that transactional distance is not determined by measuring the physical distance between students and their instructors. Instead, it is a measure of the amount of structure available to design the course content, the number of interactions between the student and the teacher, and the degree of autonomy at the individual learner's disposal (Moore, 1993; Saba, 2002).

To validate the approach used for the measurement of transactional distance, Zhang (2003) developed her five-point Likert scale of Transactional Distance to explain that transactional distance can be considered a measure of the student's difficulty in becoming actively involved in their online pedagogical environment. Zhang (2003) provided a numerical measure for transactional distance based on her five-point scale. In this regard, both the existing interaction between the instructor and the learner and the learner's autonomy can be measured (K. Peters, 2007). Notably, it is worth acknowledging that the utilisation of a five-point Likert scale, as employed in this study, can make a meaningful impact in the study results since its usage has a theoretical basis in a prior study (Zhang, 2003).

Burgess (2006) argued that learners' autonomy could influence their perceived distance and interconnection among individual learners in a group. In his study, Burgess (2006) found a positive association between students' autonomy and their perception of student-teacher interaction and learners' satisfaction in their online courses. On the contrary, the Transactional Distance Theory assumes that dialogue and transactional distance have an inverse relationship.

However, the theory postulates the existing relationship between course structure and transactional distance, a positive relationship between course structure and learner autonomy. On the other hand, several studies maintain that there is the probability that highly structured courses would have high transactional distance and less dialogue, while those that are moderately structured are likely to have low transactional distance and more dialogue (Goel et al., 2012; M. G. Moore & Kearsley, 2012; Murphy & Rodriguez-Manzanares, 2008; Saba, 2002). McBrien et al. (2009) observed in their study that learners experience difficulties and have more transactional distance with online teaching courses that are less structured. Therefore, Alotibi and Miller (2019) recommended that students should exercise more autonomy to improve distance education programmes as a matter of urgency.

However, Jung (2006) postulated that the relationship between online course structure, interaction, and transactional distance remains ambiguous and must clearly be defined to the level of learners' understanding. To avoid learning failures, Al-Harhi (2010) found online students to be the ones who always try to avoid uncertainty and prefer a course content that is highly structured and would allow a high amount of interaction between themselves and the instructor as well as their peers. Also, several prior studies which were based on TDT revealed that courses that were highly structured with high amounts of interactions significantly reduced the learners' perception of the

transactional distance in the online learning environment (Benson & Samarawickrema, 2009; Forte, 2015; Huang et al., 2016; Saba, 2002).

In terms of its significance, Tait (2017) stressed that TDT could be applied to structure the process of teaching experiments. It can also support learner activities in assessing the changes in the students learning outcomes after completing a task. The fundamental principle of the TDT's tenets is based on course structure, the degree of interaction, and learners' autonomy (Huang et al., 2016; Saba, 2011). These are the key factors that can fill the gap between the learner and the instructor, establishing a conducive learning environment (Aluko et al., 2011). All the two theories reviewed provides a theoretical foundation for the study and are considered the main theoretical underpinning in this study. Thus the adoption of social constructivism and TDT as the principal theoretical underpinning for this study sought to examine the impact of feedback strategies on the learning improvement of distance education students in Ghana using Sakai LMS is reasonably appropriate because of these theories' applicability in online learning. Several studies have extensively employed the theory that sought to examine the influence of feedback on teaching and learning in distance education (Falloon, 2011; Gokool-Ramdoos, 2008; Ustati & Hassan, 2013).

More specifically, it is applicable to adopt social constructivists and the TDT in this study because the mode of feedback and instructor-learner interactions can either increase or decrease transactional distance (Falloon, 2011; Schullo et al., 2007). Overall, the adoption of TDT was informed by Aluko et al's. (2011) position that utilisation of TDT serves a unique purpose in distance education because of the type of interaction that exists between the DE lecturers and students who engage in distance learning practices and activities in the pedagogical settings. The next section reviews the literature on Learning Management Systems and its importance to distance education.

Section B: Related Literature Review

2.3 Learning Management System and its usefulness in Education

2.3.1 What is a Learning Management System (LMS)?

Going over the plethora of literature on LMSs, defining an LMS becomes a daunting task due to embedded tools and features. Some consider its content, while others refer to the LMSs performance in meeting the learners' needs (Assaf Alfadly, 2013). Unwin et al. (2010, p. 6) define it as a "software application or web-based technology used to plan, deliver, or access a particular learning process."

On the other hand, it is "typically, a system that provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance online" (Alias & Zainuddin, 2005, p. 28). This definition explains that LMS is not only for content planning and delivery but also involves integrating activities. However, it does not explicitly include the learner's role, who is key to successful LMS deployment. According to Watson and Watson (2007), an LMS is a model that manages the learning environment, either blended or traditional, from beginning to end. The definition is comprehensive because it shows how the LMS helps an institution manage information flow and student information flow from admission to graduation.

Others agree with Watson and Watson's definition that a learning management system is a software application and a global term for the administration, documentation, tracking, reporting, and delivery of electronic educational technology courses or training programs (De Smet et al., 2016; Epignosis, 2014). Pappas (2017) described LMS as one of the paradigmatic or conventional eLearning tools, upon which all online courses and training modules depend. In other words, it is a critical asset to educationists. An LMS also allows collaboration between instructors and students, share materials, announces deadlines or assignments, and enables users to chat

(Epignosis, 2014; Lonn & Teasley, 2009; Watson & Watson, 2007). This is an implication that LMSs ensure process engineering from enrolment to graduation.

Among the available technologies for instruction and learning, LMSs appear to be the most promising tool to facilitate learner-focused instruction (Fenton, 2018). Pappas (2014) suggested that by 2019 half of the teaching and learning in most colleges in the USA will be technology-based, meaning that LMSs will feature prominently in most educational decisions, especially with massive open online courses springing up in many universities across the globe. The proliferation of LMSs has indeed become a reality with the advent of Covid-19. All these definitions point to the fact that LMSs offer both the user and installer flexibility in managing a technological learning process. It is also an indication that LMSs are unavoidable in teaching and learning especially, those providing distance education in contemporary times.

LMSs also provide opportunities for enabling institutional innovations for learning (Yildirim et al., 2014). Increasingly, different tools are being embedded in LMSs to provide the kinds of active online and e-learning engagement preferred by today's generation of students. These include discussion tools, chat rooms, wikis, forums, assignments, and blogs. The LMS tools provide learning opportunities consistent with constructivist approaches to learning rather than the simple transmission of knowledge models (Yildirim et al., 2014). The concept here is critical because learning should be engaging enough for individual knowledge creation. Learning management systems also range from systems for managing training and educational records to software for distributing online or blended/hybrid college courses over the Internet (Epignosis, 2014; Fenton, 2018). It has features for online collaboration and communication. In other words, a LMS can allow a combination of face-to-face and e-learning opportunities, that is, augmenting the lessons the teacher is giving in a brick and mortar environment, not just replace them (Epignosis, 2014).

The authors indicated that corporate training departments utilise e-learning websites to deliver online training while automating record-keeping and employee registration. Arguably, educational institutions and allied organisations are providing requisite skills to students and employees through LMSs. Thus, it is impossible to ignore the importance of LMSs in higher education and distance learning.

2.3.2 Usefulness of Learning Management Systems

The interactive features in LMSs influence pedagogical practice for both lecturers and students, in the sense that instructors will usually change their teaching style to serve students who patronized LMSs (Lonn & Teasley, 2009). Ultimately, it is incumbent upon the instructor to use the provided LMS tools to encourage a more in-depth learning experience. Students can construct new knowledge that they share with teachers and colleagues (Lonn & Teasley, 2009). Here, the belief is that when students or learners have some autonomy in the learning context, they put in much effort, which eventually develops their critical thinking, problem-solving, and creativity skills. Likewise, lecturers gain because their classes become a network of idea generation and processing instead of boredom (Yildirim et al., 2014).

Furthermore, Weimer (2002) argued that lecturers or instructors who adopt the learner-centred approach reduce content and focus on allowing students to develop skills that lead to self-awareness, self-reflection, and critical thinking. In other words, lecturers must perceive their students to achieve and develop creative ways of engaging them through technology. Pappas (2014) further identified eight (8) benefits that LMSs can offer which overlap some of the benefits that Fenton (2018) identified, namely organizing eLearning content in one location; providing unlimited access to eLearning materials; easily tracking learner progress and performance; reducing Learning and Development costs; reducing Learning and Development time; keeping organizations up-to-date with compliance regulations; quickly and conveniently expanding

eLearning courses, and integrating social learning experiences. LMSs are, therefore, useful in enhancing interaction between learners and lecturers and support social construction concepts.

2.3.3 Features of LMSs

LMSs come with different features, interfaces, and tools that enable collaboration and interaction among users. According to Pappas (2017), some features that help online instructional delivery include blended learning tools that take care of various learning needs (synchronous and asynchronous), powerful customised reporting, on-the-go experience for users, and certification support. Others include the LMS's ability to provide easy migration of data, social media support, creativity, fun environment (gamification), collaborative, and personalised learning paths (Omer, 2017). In a typical eLearning environment, the following features have been identified, namely forum, chatrooms (online and offline), module structure, multimedia (voice and video), blogs/wikis/journals, calendar, quizzes, assignments, drop-box, and rubrics (Carruthers et al., 2015; Dang et al., 2011; Yuen et al., 2009). As such, LMSs form a centralized learning environment from which all the other tools can be launched, providing many benefits for both lecturers and students (Kigundu, 2014; Pappas, 2014).

For instance, LMS's responsiveness goes a long way to ensure that the user (learner) is comfortable in the eLearning environment. According to Kigundu (2014), faculty members perceived the features of LMS as providing control over registered users, a secure environment for learning, learner-centred and not only course centred, allowing members to capture and retain shared knowledge, providing privacy as well as public access, an opportunity for institutions to maintain links with former students and connect with future students, archiving and migrating data quickly as well as a quick content update. From the students' point of view, the LMS features that benefit most are centralised learning environment that ensures consistency and uniformity of content,

learner-centred, immediate capabilities evaluation, fostering self-paced learning, personalization, time, and location flexibility, just-in-time help, and encouraging students to take responsibility.

Significantly, LMSs, as a learner-centred software, provides an opportunity for interaction, collaboration, personalised learning, and autonomy, especially for learners. In other words, without the preferred features, LMSs will not be attractive enough for faculty and students to use them. Therefore, it is imperative in the Ghanaian educational landscape, where the use of LMSs is now trending. Furthermore, Kigundu (2014) suggested four classifications of educational technology tools relevant for higher educational institutions to sustain collaboration and interaction among students. They include learning management systems, live collaborating devices, computer-assisted applications, and gamification software. Among these categorisations, LMSs appear to be the preferred tools of e-learning because of the varied features it provides. Thus, excellent LMS infographics exist with the most popular options and features as measured by combining the total number of customers, active users, and social media presence (Fenton, 2018; Pappas, 2014). Therefore, choosing a particular type of LMS tools is influenced by a given learning activity's objectives and improving the teaching and learning process. In fact, due to the coronavirus pandemic, several educational providers have installed and used LMSs to help bring students, faculty, administrators, and other staff together. LMSs will also ensure that people avoid face-to-face meetings and personal contact to contain viral pandemics.

2.3.4 Factors that impact the use of LMS among Students

Generally, the expectation is for faculty and students to use LMSs when installed for teaching and learning. However, a study in Qatar by Nasser et al. (2011) suggested that versatile students in ICTs were less likely to use LMSs if it was not designed to meet their needs. They may perceive it as boring. Again, students who were not mandated to use the LMSs did not see the need to use it (Nasser et al., 2011). On the contrary, Mijatovic et al. (2013), found that the interactive nature of LMS coupled with face-to-face participation led to higher student achievement in Serbia. In a

similar notion, a study conducted in two Australian universities involving 1658 students showed that Learning Management systems were touted as the most useful digital technology because it enabled high interaction between lecturers and students who used it (Henderson et al., 2017). These findings show mixed results regarding why students use LMSs. However, the findings by Mijatovic et al. (2013) and Henderson et al. (2017) indicate that the level of interaction within LMS leads to higher usage, implying that the various tools and features available to learners may influence usage among learners and instructors.

Finally, LMS features should be flexible enough to allow feedback exchange between users (Dang et al., 2011). In a related study from the Ghanaian perspective, Biney (2019) reported that inadequate training and internet access are some downsides to utilising LMSs. DE students prefer higher bandwidth and flexible navigation of the LMS. On the contrary, Tagoe and Cole (2020) found that nursing students at the University of Ghana had better experiences using the Sakai LMS. The next section reviews the literature on feedback as it pertains to learning.

2.4 Feedback in Learning

Feedback is essential in education because it helps learners maximise their potential at different learning stages and raise the awareness of strengths in areas that need improvement. Rodgers (2006, p. 209) described feedback "as a reflective conversation between teacher and students wherein students described their experiences as learners, with the goals of improving learning, deepening trust between teacher and student, and establishing a vibrant, creative community on a daily basis." Feedback, thus, delivers the "just-in-time, just-for-me information" that drives students to exert effort according to Brookhart (2008, p. 1), in a face-to-face class environment. Consequently, feedback leads to an understanding of what was said, producing the right response. Brookhart further suggested that feedback can be positive or negative, and so, maybe or not, be useful. Therefore, how feedback is provided or delivered is very critical. Negative or positive

feedback can then become a culture within the learning space. In other words, it can drive or derail the learning process. The concern is that feedback must necessarily emanate from the instructor rather than respond to students' malicious behaviour, implying that a particular type of feedback strategy is essential for learning to occur.

Feedback can also mean different things to different people depending on the context that applies. In learning, feedback "is conceptualized as information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding" (Hattie & Timperley, 2007, p. 81). This definition identifies various roles that impact the learning process. Another definition worth noting is that given by Archer (2010), who qualifies feedback by its effectiveness. He states that "feedback may be defined as information about previous performance used to promote positive and desirable development" (Archer, 2010, p. 101). The implication is that feedback is not a one-off activity but a process that allows learners to achieve more outstanding results.

Similarly, feedback provision should follow with implementation by students (Guasch et al., 2019). Thus, feedback must be embedded in a course syllabus to achieve desired outcomes (Dang et al., 2011). Archer (2010) further suggested that feedback cannot be one-way as it becomes ineffective. This argument means that feedback must take the form of exchanges between the learner and the teacher or any of the stakeholders mentioned by Hattie and Timperley (2007). Feedback is also said to be informative, progressive, and invites a student or learner to respond (Mahoney et al., 2018).

In other words, feedback is corrective and requires the student to reflect on what they received. Several authors agree with the exchange or dialogic position of feedback (Crimmins et al., 2016; Espasa et al., 2018; Hattie & Timperley, 2007; Nicol, 2010). From these definitions, this current research proposes that feedback is a give and take process and requires that the teacher/facilitator

and learner would use all the resources (librarians, administrators, colleagues, friends, parents, and reading materials) available to them for the development of the learner in the blended learning environment.

Feedback thus works within a teaching and learning context where it is used to bridge misconceptions about a learning goal (Hattie & Timperley, 2007). In this regard, feedback must necessarily occur as part of the curriculum to be delivered and is formative. They further advocate that for feedback to be useful, three questions must be addressed by any of the parties involved in the feedback process such as what goals to achieve (feed up); how to achieve the goals (feedback), and what measures to improve next goals (feed-forward where the goals keep changing). To answer these questions, they proposed a model with four feedback levels that further influence feedback effectiveness. They include correctness or otherwise of the task or assignment that has been undertaken (directive feedback); processes the learner engages in to complete a task; feedback that encourages a learner to self-regulate; and commendation feedback, which does not often impact task performance.

Again, Hattie and Timperley (2007) argued that combining these questions and levels of feedback can yield different options for feedback effectiveness. There is also a constructive relationship between the four levels of feedback. At the task level of feedback, learners benefit by clarifying their misconceptions about the task. In contrast, at the process level of feedback, students generate mental models about what is to be achieved. Lastly, the self-regulation aspect of feedback leads learners to the exertion of effort and self-efficacious behaviour because they are highly motivated to achieve. To these authors, compliments (self-level feedback) given to learners on task performance is not often useful. It means that, for instructional purposes, feedback must provide specific information relating to tasks (Sadler, 1998). This instructional gap between teaching and

task performance can be bridged through affective or cognitive processes in which the student is directed to a specific action (Hattie & Timperley, 2007).

Consequently, feedback and its responses should tailor toward specific goals in the curricula. For example, the learner plays an active role in receiving and using feedback to advance their learning (Guasch et al., 2019). In other words, the learner or student must be allowed to implement feedback. The implication is that institutions must agree on benchmarks to attain regarding curricula usage (Ruohoniemi et al., 2017). In Ghana, these institutions include the National Accreditation Board (NAB) and the National Council for Tertiary Education (NCTE). For instance, the NAB requires that the learning environment be interactive and promote multimedia use as well as the use of both formative and summative assessments (National Accreditation Board, 2018).

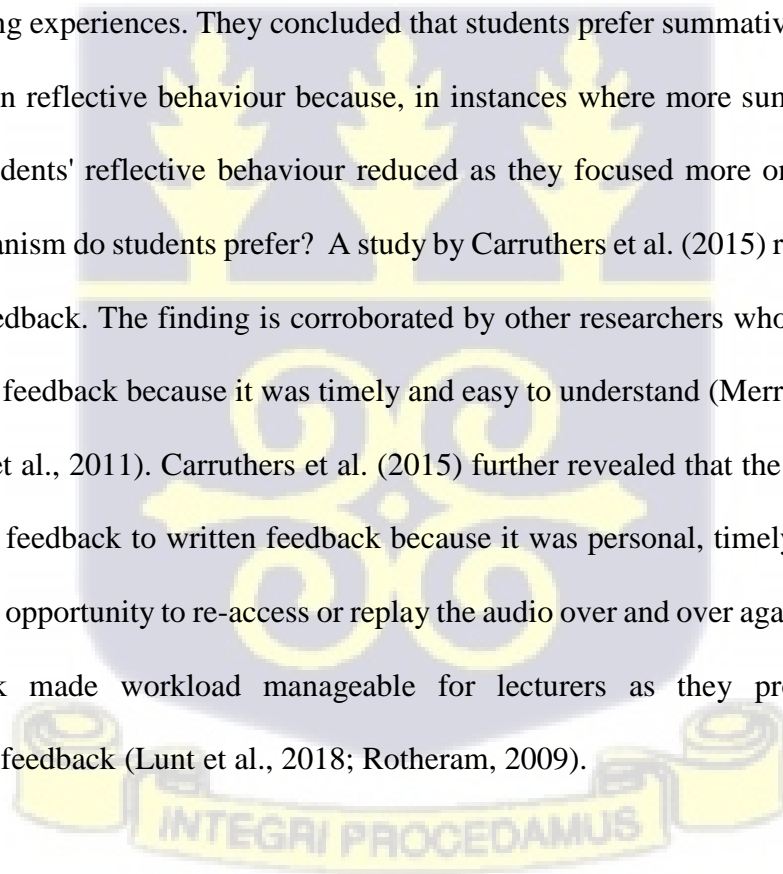
The learning approach also determines whether a learner will engage in reflective behaviour or not after receiving feedback. Researchers have identified three approaches to learning among students in the literature: deep, surface, and organised styles of learning (Entwistle, 2009; Ruohoniemi et al., 2017). They intimated that the in-depth approach is when students reflect on feedback given to them and use that feedback to improve learning and build on the experience in the next learning opportunity (Ruohoniemi et al., 2017). Formative feedback strategies engender in-depth learning. Surface learning, on the other hand, is about regurgitating what they received in the form of learning materials (Ruohoniemi et al., 2017). Surface learning works well for students where summative feedback is practical. However, students' learning approaches depend on the context (Parpala et al., 2013). That is the level of understanding of the learner and a given workload in a given learning setting. The final approach, which involves using time well and effort, is considered more of a studying style than learning. This research disagrees with this view of studying because when a learner spends time and effort to study, they gain knowledge. When that knowledge is

practiced, then learning has occurred. In other words, a studious person is more likely to practice reflection than those who do not study.

2.4.1 Importance of Feedback to Students

There is debate about whether students value feedback from their lecturers or peers and its influence on their performance, and whether they will use the experience in the future. Higgins et al. (2002) found that students prefer formative assessment as it helps the student develop argumentative, critical thinking, and analytical skills. Others postulated that learners favoured various feedback strategies directed personally at them (Paterson et al., 2020).

On the other hand, Aoun et al. (2018) found that both summative and formative assessment significantly helped form a feedback perception among learners and that this perception influenced students' learning experiences. They concluded that students prefer summative assessments rather than engaging in reflective behaviour because, in instances where more summative assessments are utilised, students' reflective behaviour reduced as they focused more on grading. So which feedback mechanism do students prefer? A study by Carruthers et al. (2015) revealed that students prefer audio feedback. The finding is corroborated by other researchers who report that students preferred audio feedback because it was timely and easy to understand (Merry & Orsmond, 2008; Rodway-Dyer et al., 2011). Carruthers et al. (2015) further revealed that the majority of students preferred audio feedback to written feedback because it was personal, timely, or promptly given and provides an opportunity to re-access or replay the audio over and over again. In related studies, audio feedback made workload manageable for lecturers as they provided quality and comprehensive feedback (Lunt et al., 2018; Rotheram, 2009).



2.4.2 Feedback, Reflectivity, and Curriculum Design

For students to engage in reflective behaviour, feedback is a necessary aspect of the curriculum or syllabus. This is important because a curriculum devoid of feedback will fail to produce reflective behaviour among learners (Aoun et al., 2018). The connection between feedback and reflexivity is that students' learning will be improved (Aoun et al., 2018) since useful feedback affects reflective knowledge generation (Nicol, 2012). The insinuation is that an integrated approach to learning must be embedded in the curriculum. To Archer (2010), the way to attain such integration is to enable a culture of feedback spelled out in the syllabus, which both teachers and students share. The approach can be entrenched with proper training as the parties seek and encourage feedback usage (Archer, 2010).

Boud and Molloy (2013) argue that enough time should be provided for students to work on assignments with adequate feedback to promote learning, rather than focus on course completion and certification. In other words, a formative feedback utilisation rather than summative is encouraged. It suggests that students will have enough time to reflect on a subject in order to reconstruct knowledge. This process leads to critical thinking and analytical skills development (Quinton & Smallbone, 2010). Again, learners will have enough time to receive information from all the needed stakeholders to aid their reflection process. Using feedback to engage in reflection is important because it leads to experiential learning, and this should be at the centre of the learning process (Mutch, 2003; Quinton & Smallbone, 2010). Other researchers agree that for feedback to be useful, it must be a key component in the curriculum or syllabus (Aoun et al., 2018; D. Boud & Molloy, 2013). Schwartz and White (2000) have also commented on feedback quality and its relationship to instructional design. Indeed, feedback that engages both teacher and learner is said to be formative (Sadler, 1998). Higgins et al. (2002) assert that students are intrinsically engaged with feedback as it helps them organise in detail their learning processes. In effect, the quality of

feedback received can lead to greater reconstructions of knowledge among learners because they can think about their work production.

Higgins et al. (2002) also join the debate that the timing and type of feedback is vital for students to want to use feedback to improve their learning and that students should be aware of these issues. In this vein, feedback is vital for reflection, as it is a function of constructive feedback. It can also be inferred that personalisation of feedback is critical to the learner. The teacher is said to be the driving force in the feedback loop so long as teaching and learning are concerned (D. Boud & Molloy, 2013). A guiding principle would be for teachers to reflect on how their feedback to students impact their learning experience (Delante, 2017). Therefore, the lecturer's propensity to show that they practice reflectivity from the comments provided would build learners confidence in feedback, consequently, making them value formative feedback.

2.4.3 The Nature of Feedback in Learning Environments

Useful feedback engenders the exchange of ideas or information (dialogic), and it is cyclical (Nicol, 2010). Written comment as input communication is problematic, and this transmission approach is a barrier to learning (Nicol, 2010). Therefore, feedback that generates dialogue produces interaction. It takes place between lecturers and students and their peers with active student participation and contributes to significant learning improvement (D. Boud & Molloy, 2013; Carless, 2013). Feedback is also said to be informative, progressive, and invites the student or learner to respond (Mahoney et al., 2018). It is suggesting that corrective feedback requires the student to reflect on what has been received. Several authors agree with the exchange or dialogic approach to feedback (Crimmins et al., 2016; Espasa et al., 2018; Hattie & Timperley, 2007; Nicol, 2010).

Guasch et al. (2019) conducted a study in an online learning context based on three feedback types. According to these authors, feedback can be corrective, referring to the required content and

whether the submission addressed the required content. It can also be 'epistemic feedback,' which implies that the student needs to explain why they chose some options and not others, thus engaging in critical analysis. 'Suggestive feedback' directs the student to explore, expand, or improve ideas further. Further, 'epistemic plus suggestive' feedback is the act of asking the student to explain and clarify issues and direct them to look at options critically before making choices. The authors found that epistemic plus suggestive feedback engendered higher writing collaboration among students leading to better performance. Thus, in providing online feedback on students' assignments, the lecturer should use more questioning and directing the student to ensure student engagement with the content and do more research.

In online settings, various forms of feedback techniques are adopted. Moreno (2004) postulates that for learners to be actively engaged in an electronic environment, they need to create a mental model system. Implying that the system to be used must be well explained within the curriculum before learners can use it well. Again, to engage in reflective behaviour the feedback strategies to be employed must be understood by the students to engage with it actively. It is also believed that interaction in learning improves within a well-developed technology (Woo & Reeves, 2007). In an online study by Tsai (2013), he found that where there was cooperation and feedback provided that allowed learners to organize their learning, students performed better. He suggested a need for feedback that directed students to own their learning and initiate interaction and cooperation between students. This suggestive nature of feedback is positive (Guasch et al., 2019).

Furthermore, the study by Carruthers et al. (2015), concerning giving voice feedback in a virtual learning environment found that students appreciated audio feedback because they found the technique useful even though they had problems with the technology used. Their study revealed that students preferred electronic feedback to written feedback because electronic feedback was convenient, personalised, practical, and flexible (Carruthers et al., 2015).

The technique used by these authors shows that formative feedback provided through the favourable strategies enables student learning and satisfaction. In a related study, Cross and Palese (2015) argued that forum discussions in online settings using formative assessment led to increased students' learning. Also, digital video feedback used for pre-service teachers was found to be effective (Pereira et al., 2016). Online synchronous approaches have some advantages, including instant feedback and a higher level of interaction between the stakeholders in the learning environment (Schullo et al., 2007). However, it is essential to note that synchronous learning in the online environment is useful only to the extent that the structures are working well.

From the nature of feedback in the above discourses, a culture of feedback can be gleaned for effective feedback practice in universities. Consequently, Winstone and Boud (2019) found that Australian and UK lecturers responded differently to the issue of feedback. Australian lecturers were more concerned about their students using feedback to improve learning than their UK counterparts. The feedback culture among Australian lecturers indicates the level of commitment to ensuring that students graduated with high skill levels. Thus, the perception of lecturers regarding the value of feedback in online learning is a critical issue. Lecturers who attach little value to feedback may do a disservice to their students. Likewise, students who do not use feedback from their teachers may not encourage their lecturers to give feedback.

2.4.4 Formative Feedback

Formative feedback can refer to an "assessment that is specifically intended to provide feedback on performance to improve and accelerate learning" (Sadler, 1998, p. 77). Formative feedback can also be described as the propensity to transform students' learning patterns (Mutch, 2003). In other words, the recipients of feedback give responses back to the feedback provider to establish understanding. Formative assessment is integral to the teaching and learning process because tutors or lecturers get the opportunity to correct learners who, in turn, use the information to build on

knowledge gained (Biggs, 1999). Thus, feedback is designed to shape the thought patterns and improve learning when delivered in the right manner (Aoun et al., 2018; Shute, 2008). Hattie and Timperley (2007) asserted that formative feedback is the type and form of feedback that makes the learner's difference.

Shute (2008) advocated that, even though there is not a single prescription for formative feedback, it does improve learning where the teacher and the learner have learned the art of directing feedback appropriately. Dialogic feedback, which is formative, also promotes learning improvement (Green, 2019). Others have researched on how formative feedback helps students to capitalise on feedback to impact their performance positively. Here, the feedback provider uses questions and suggestions to motivate the learner to work hard towards achieving their learning goals (Guasch et al., 2019). They mentioned four types of feedback: remedial, interrogative, suggesting ideas, and a combination of interrogative and recommended ideas (Guasch et al., 2019). Their findings suggest that it is the fourth type of feedback that actually leads to learning improvement and higher academic performance.

Meanwhile, Espasa et al. (2018) suggested a poor understanding or perception of feedback among instructors and students. Moreover, some challenges have also been cited for hindering formative feedback. The next section puts the challenges into focus.

2.4.5 Challenges to providing Formative Feedback

Several barriers have been identified in the literature that hinders useful feedback among teachers and students. The capacity to work in a virtual environment, and interpreting written feedback was an arduous task for most students in a study by Cramp (2011). The inability to break down feedback codes or read written assessments deepens students' frustrations about their learning capacity (Cramp, 2011; Higgins et al., 2002). Ilgen and Davis (2000) and Janssen et al. (2007) stated that feedback that is full of psychological incivility does not help student learning either. In

effect, students worry about the language of feedback they receive. In this regard, tutor interaction to clarify these issues is beneficial.

On the other hand, when tutors feel that students are not making fair use of office hours or other options available, there is a disregard for feedback provision altogether (Higgins et al., 2002). They further suggested that a challenge to formative feedback use is a lack of understanding of the assessment criteria. In addition, when the course is modular-based, coupled with low feedback standards and humiliating comments from tutors, it makes learners shy away from feedback (Higgins et al., 2002).

In a study by Bird and Yucel (2015), coding was used to determine students' understanding of feedback. They found that the feedback code is useful. However, students must be aware of how to interpret these codes. Therefore, Sadler (1998) suggests training for students who cannot interpret or understand feedback criteria or codes in order for them to connect feedback with the production of assignments and avoid mistakes. The ability to interpret the feedback code may improve their self-worth and encourage them to take advantage of feedback. Given the role that feedback plays in promoting learning, Cramp (2011) indicated that the giver of feedback must identify the most effective way and give it with dignity, especially in the first year of learners.

It is important to note here that feedback should be given with respect at all learning levels since a person's self-esteem may be dependent on it so, demeaning messages must be avoided. Also, Sadler (1998) stated that delayed feedback is a challenge for learners struggling to understand what is being taught.

Furthermore, Cramp (2011) stressed that tutor support feedback intervention, which guides learners to belong in academia, provides them with a window of opportunity to achieve and progress. However, he lamented that the gains made in such feedback interventions could be

compromised or sacrificed when lecturers work under stressful conditions. Invariably, this puts a strain on students and lecturers' relationship, especially regarding the lack of appropriate resources to motivate lecturers. There are also costs associated with providing quality feedback with current increases in student numbers (Sadler, 1998).

Most of the discourse above is about feedback that takes place in traditional face-to-face classrooms. However, as student enrolment rises, some researchers are worried about how feedback provision can be sustained (Higgins et al., 2002). More so, as institutions are gradually integrating technology into education, written comments on student work are critical for learning improvement and developing other skills. Some have indicated that giving feedback in online settings is complex (Belin, 2019).

2.4.6 Feedback Strategies

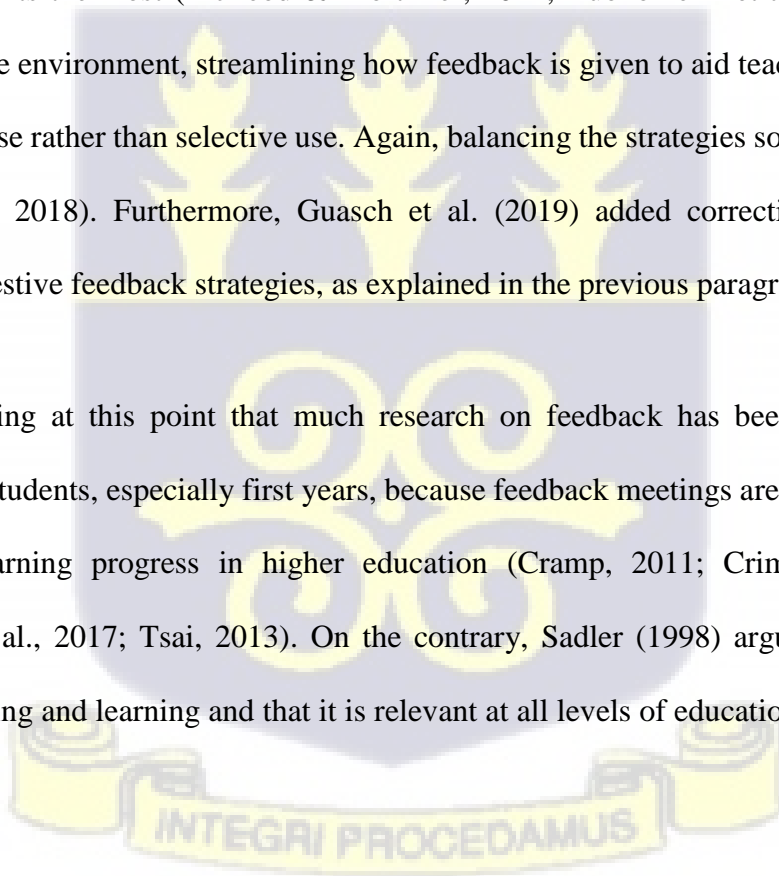
Aoun et al. (2018, p. 84) identified five feedback mechanisms in the research they conducted. These include feedback given by colleagues (peers), summative feedback (grades) on assessments, generic (formative) feedback on assessments; feedback on lecture exercises; and feedback on tutorial activities. These mechanisms were embedded in a university course curriculum they investigated.

Some of these mechanisms are related to formative and summative feedback. Verification is another type of feedback that confirms whether a thing is right or wrong, and there may be more variables to such a feedback mechanism (Shute, 2008). Elaborative feedback can be addressing a topic, a response from the learner, particular errors, (specific and directive) or provide samples for guidance, or counsel the learner - general and facilitative (Archer, 2010; Shute, 2008). In other words, elaborate feedback strategies can be verbal (written or oral).

Written feedback strategy sometimes involves the use of codes. McLeod and Mortimer (2012) argued that faculty or teachers use codes in providing feedback and that students must be equally aware of the feedback and use feedback for effective learning. An argument that is critical because if students do not know the types and forms of feedback available, how would they identify and use feedback? They also agreed with other researchers that assessment provided as end-point measurement (summative) does not lead to effective learning (Espasa et al., 2018; McLeod & Mortimer, 2012; Sadler, 1998).

Indeed, researchers are very concerned with how students engage effectively with feedback that positively impacts the learning process (McLeod & Mortimer, 2012). In terms of useful feedback, the literature suggests that institutions that used feedback instruments designed into the curricula benefitted students the most (McLeod & Mortimer, 2012; Ruohoniemi et al., 2017). Indicating that, in an online environment, streamlining how feedback is given to aid teaching and learning is a matter of course rather than selective use. Again, balancing the strategies so that learners benefit is key (Brown, 2018). Furthermore, Guasch et al. (2019) added corrective, suggestive, and epistemic-suggestive feedback strategies, as explained in the previous paragraph.

It is worth noting at this point that much research on feedback has been conducted among undergraduate students, especially first years, because feedback meetings are useful to students to adjust their learning progress in higher education (Cramp, 2011; Crimmins et al., 2016; Ruohoniemi et al., 2017; Tsai, 2013). On the contrary, Sadler (1998) argued that feedback is critical to teaching and learning and that it is relevant at all levels of education and should be part of the syllabus.



2.4.7 Factors influencing the use of Feedback

One major factor that impacts feedback is the timing issue. Nicol (2012) argued that user feedback is dependent on the time given. Hattie and Timperley (2007) asserted that feedback should be given after the student responds to instruction. They were implying that the teacher would ascertain whether the student understood what was taught or not. Further, Nicol (2012) discussed other factors that influenced feedback, such as the person receiving it (they need to understand the criteria of feedback), the situation, and the giver's expertise, which are necessary to enhance the learning process. Sadler (1998) also outlined three factors that influence feedback usage, including the timing of feedback or priority to the student's task, the context within which it is provided, and nature or form.

Grades do not help students much as it is not accompanied by comments, especially in situations where students are cognitively incapable (Sadler, 1998). Besides, the teacher is the most knowledgeable in the teaching and learning context whom the learner looks up to. Others have discussed immediate or delayed feedback to engender critical thinking skills (Shute, 2008). Shute (2008) argued that when feedback is delayed, it allows learners the possibility to engage in analytical processing of the information received, which leads to autonomy, self-efficacy, and facilitates learning.

2.4.8 Frameworks used to provide Feedback in Technological Environments

Regarding what works, Bird and Yucel (2015) proposed the DUAL feedback framework. They postulated that feedback codes provide succinct information that leads to non-repetition of errors in assignments. The DUAL framework they designed helped first-year students to improve their self-efficacy in self-assessment. Thus, an understanding of feedback coding is valuable as it factors in the peer-review approach. However, the framework applied face-to-face, computer-assisted learning settings. So, it is essential to situate the framework within the online or blended

environment to see how students will respond to it. The authors criticized the DUAL framework stating that it was confusing for some students who could not decode the items used in coding feedback as it applied to pre-summative assessment. Nevertheless, the DUAL framework provides a structure to guide the use of feedback. Thus, they argued that it could be beneficial when the framework is institutionalised so that all students in the institution will acquire self-assessment skills. Institutionalisation will also ensure that all lecturers follow a systematic process of giving students feedback that they can depend on to learn.

According to Heywood (2000), there has been a shifting paradigm from dependency on a one-off assessment to continuous and impacts the teaching-learning process effectively. The shift is partially due to students' agitation about non-scoring learning activities, consequently, led to less and less feedback in the assessment continuum (D. Boud & Molloy, 2013). In other words, in a blended or online learning environment, formative feedback linked with some form of grading is essential for learning.

Various authors have proposed that useful feedback must follow the exchange or conversational process (D. Boud & Molloy, 2013; Espasa et al., 2018; David Nicol, 2010). In this regard, dialogue in feedback, first mooted by Nicol (2010), is a way of improving learning through information exchange. He argued that as class sizes increased, both students and lecturers become dissatisfied with written feedback mainly because feedback provision was one-way, either from the lecturer to the student or vice versa. He proposed "that feedback should be conceptualised as a dialogical and contingent exchange that involves coordinated teacher-student and peer-to-peer interaction as well as active learner engagement" (Nicol, 2010, p. 503). This strategy positively impacts the learning process. Boud and Molloy (2013) also revealed that if the feedback is extrinsic (depending on others for the needed information to learn), then there is a low perception of the student's learning environment. The critic suggests that feedback is more than just reading a comment given by a

lecturer or colleague. It must lead to critical analyses by the student. Similarly, sustainable feedback, which is internal, projects the student to engage with the learning process. Thus, in an online or blended learning context, learners need to be involved with the feedback process.

The dialogic view of feedback sits well with other researchers such as Espasa et al. (2018), who developed a two-way feedback measurement index for online learning settings. They asserted that the principle of exchange in feedback improves learning. This learning type is personalised in three aspects; general information, same mistake information, and individual information. Invariably, the exchange lens of feedback helps students understand the concepts presented and use them in their learning activities as they progress. They argued that five components of feedback are relevant in online teaching and learning. These are "assessment type (individual or group), the timing of feedback, personalisation of feedback, feedback form, feedback type, peer feedback, and resubmission opportunities" (Espasa et al., 2018, p. 500). On resubmission, Vardi (2013) also figured out that learners will not bother when they received feedback when students cannot act upon it.

Furthermore, all the components they outlined are necessary for dialogic feedback because it is at the collaborative stage that learning improvement occurs (Espasa et al., 2018). This viewpoint is debatable. If some component is absent, what will it mean for dialogic feedback? It was also suggested that learners and instructors lacked understanding of what feedback is in an educational environment (Espasa et al., 2018). Another approach to user feedback in learning was proposed by Sternad (2015), arguing that a 'challenge-feedback' is relevant for higher education learning improvements based on goal-setting theory and performance. They conducted empirical research in a computer-assisted learning environment.

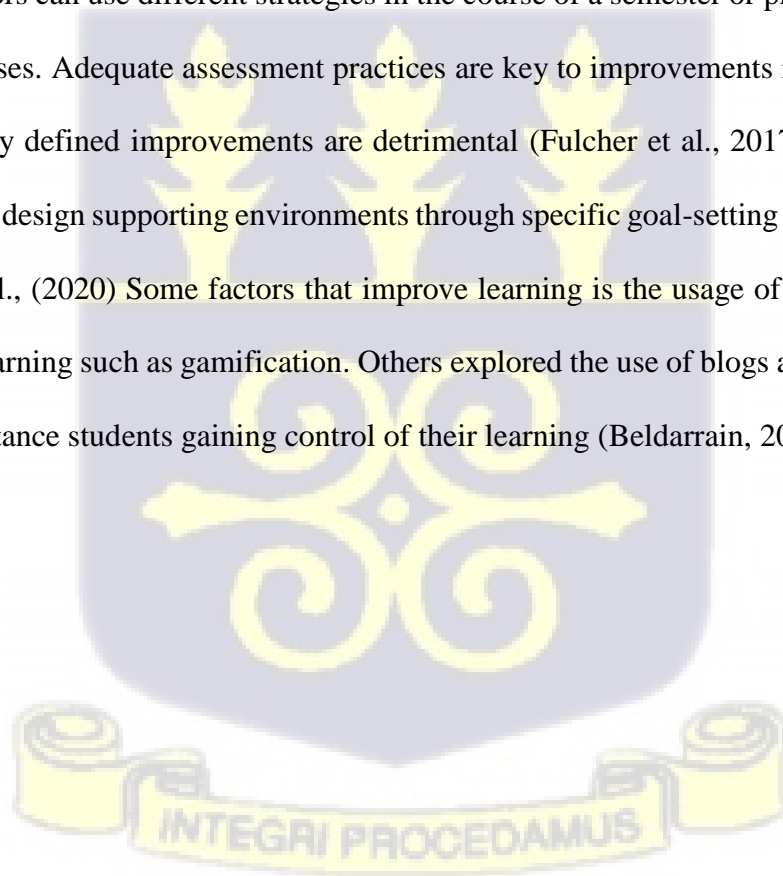
The challenge-feedback learning (CFL) framework progresses through a four-stage process. Namely: challenging task, action, feedback, and reflection. Once a cycle is complete, another challenging cycle begins using the knowledge and skills gained from the previous challenging task culminating in 'expert' performance Sternad (2015). This strategy is also referred to as feed-forward, where students receive feedback at the beginning of task performance (Aoun et al., 2018; Crimmins et al., 2016; Hattie & Timperley, 2007).

One key issue that emanated from this literature review is whether, from the Ghanaian perspective, students have the opportunity to improve their work and resubmit, especially within the online (Sakai) setting. This aspect of feedback is essential as it allows the student or group of students to critically reflect and re-examine their work – a constructivist component of learning and giving room for dialogue. This type of learning may also lead to a permanent change in behaviour leading to skill development that positively impacts performance. Consequently, the current research agrees with assertions that feedback should be an exchange process. However, the concept is placed within the online learning environment just as Espasa et al. (2018) but in a particular learning software (Sakai LMS).

Furthermore, most of the research on feedback conducted among level 100 undergraduate students were assumed to be inexperienced in higher learning settings (Cramp, 2011; Ruohoniemi et al., 2017; Sternad, 2015; Tsai, 2013). However, as they progress to higher levels, it is crucial to ascertain whether the experiences gained (either through technology and feedback interventions) from first and second years are utilised to improve learning autonomy. The research also explored Ghanaian students' non-assertive behaviour to determine whether the western notion of exchange feedback works in this context of the learning environment.

2.4.9 Learning Improvement

Learning improvement is the achievements that students make in the learning process. Learning improvement is “making a change to a program and then re-assessing to determine that the change positively influenced student learning” (Fulcher et al., 2017, p. 4). Terenzini (2020) asserted that learning improvement is based on the teaching and learning experiences and suggested six features that enabled learning improvement among students. These include when students come across thought-provoking concepts, ideas or people, students’ actively involved with the challenge, happening in helpful settings, inspire practical learning, include other people, encourage reflection. More so, peer assessment and active engagement of peers in providing quality feedback lead to positive gains in learning improvement (Lan Li et al., 2010). Discovery learning and redesign also lead to positive learning outcomes among distance education students (Ames, 2016). In other words, instructors can use different strategies in the course of a semester or programme to support learning processes. Adequate assessment practices are key to improvements in learning but when they are vaguely defined improvements are detrimental (Fulcher et al., 2017). Thus, institutions must create and design supporting environments through specific goal-setting practices. According to Sánchez et al., (2020) Some factors that improve learning is the usage of innovative ways for teaching and learning such as gamification. Others explored the use of blogs and wikis to meet the demands of distance students gaining control of their learning (Beldarrain, 2006).



2.5 Proposed Conceptual Framework

As a result of the review of literature, research objectives and questions, a proposed conceptual framework has been captured in Figure 2.2 below.

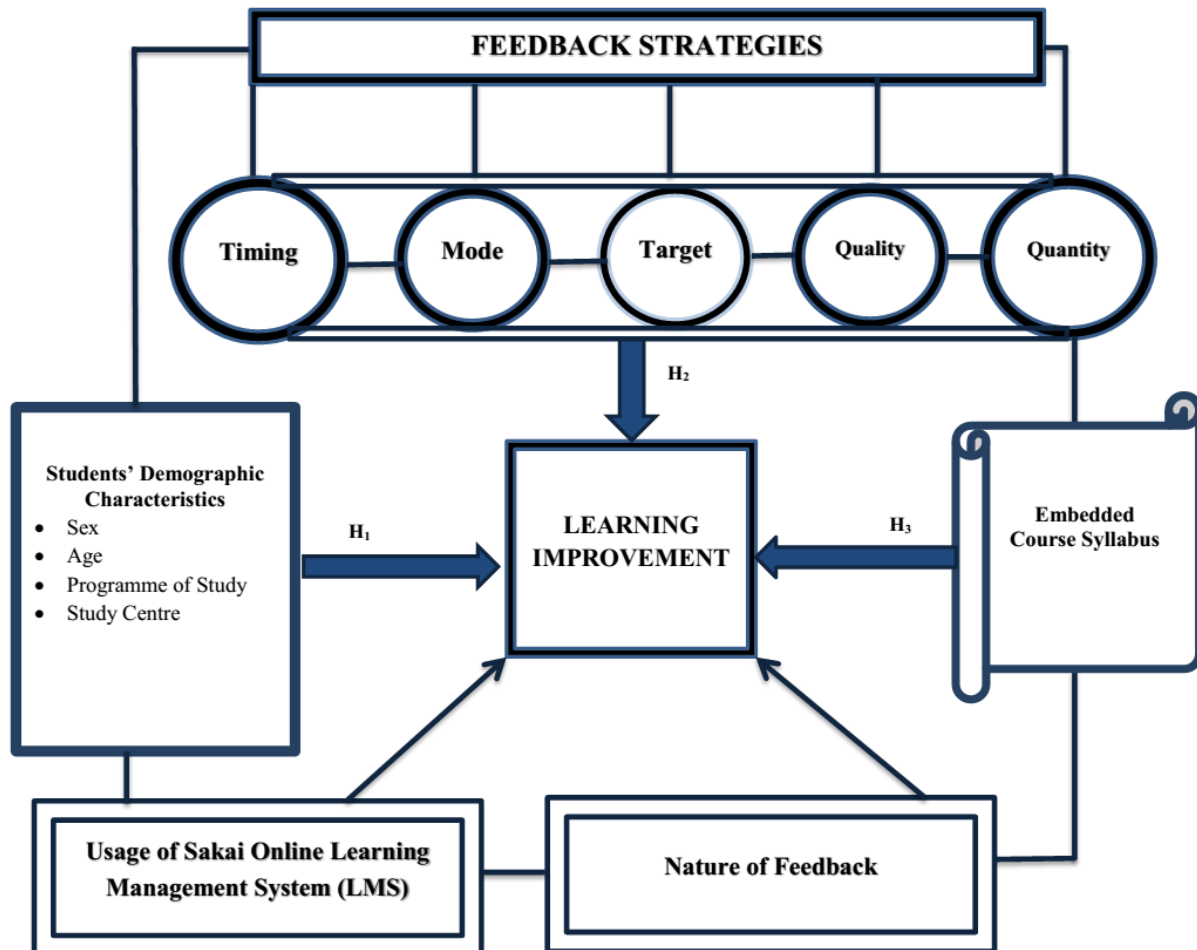


Figure 2. 2: Proposed conceptual Framework for Feedback Strategies and Learning improvement in Sakai learning platform (Author's conception)

The conceptual framework (Figure 2.2) depicts the nexus between feedback strategies, demographic characteristics, Sakai LMS, embedded course syllabus, and learning improvement. The independent variables are feedback strategies, demographic characteristics, Sakai LMS, embedded course syllabus, and the nature of feedback. The framework also demonstrates how distance education students' demographic characteristics relate to Sakai LMS and learning improvement in reflectivity, self-directedness, and skills development (collaborative and research skills).

The assumption is that the adoption of feedback strategies focusing on timing, mode, target, quality, and quantity would significantly influence DE students' learning outcomes relative to reflectivity, self-directedness, and skills development. Thus, the assumption is consistent with the social constructivist's belief that using an appropriate learning approach influences learner's behaviour and, as such, provides a relevant attitude (reflection) for learner's success (Lynch, 2016). From the constructivist approach, learners' experiences from group work lead to knowledge generation (Bada, 2015). Furthermore, the framework is consistent with the transactional distance theory that dialogue reduces distance learners' perceived distance. The assertion is consistent with Al-Harthi (2010) findings that students avoid uncertainty by preferring programmes with a high structure with high interaction levels.

In terms of students' characteristics, the conceptual framework was designed to anticipate that DE students' demographic characteristics can play a significant role in determining students' usage of Sakai and learning improvement. The assumption also falls within Lai and Hong's (2015) observation that students' demographic characteristics are useful for technology use for learning, and those characteristics can directly or indirectly impact learning. All these assumptions are grounded in the various research hypotheses the study sought to test the assumed relationship among the variables of interest captured in the conceptual framework. For instance, the first hypothesis ($H_{0:1-4}$) tests whether or not there is a likelihood that DE students' demographic characteristics influence learning improvement. On the other hand, research hypothesis two ($H_{0:5-9}$) are set to test whether or not each of the components of feedback strategies (timing, mode, target, quality, and quantity) relates significantly with learning improvement. In contrast, hypothesis three was set to test whether there is a significant influence of the feedback embedded course syllabus on learning improvement.

Overall, the conceptual framework is expected to confirm, or otherwise, that feedback strategies based on timing, mode, target, quality, and quantity relate to learning improvement. The study also anticipates that DE students' characteristics will significantly influence DE students' in reflectivity, self-directedness, and skills development. Finally, it is expected that a feedback embedded course syllabus and the nature of feedback will have a significant relationship with learning improvement.

2.6 Summary of Literature Review

This chapter has examined theoretical perspectives and the empirical literature and aspects of learning management systems and feedback necessary for learning improvement. The literature suggests using learning management systems in teaching and learning, especially in an era of mass enrolment in higher education. Students will use LMSs because the LMS has features that lead students and teachers to collaborate, interact, and communicate. In this context, the embedded curriculum must be designed with feedback components that ensure dialogue between teachers, students, peers, and other relevant stakeholders in the learning environment. The review also showed the use of formative feedback in LMS and its relationship with reflectivity, and the feedback strategies employed. Whether feedback utilisation is vital to students' learning improvement, the challenges associated with formative feedback and some feedback models were reviewed. This research mainly adopted the dialogic framework of feedback, which is referred to in the thesis as interactive feedback. The literature suggests that when feedback is appropriately practiced, learning improvement occurs and culminates in learner skills development.

It has been found that effective dialogue in feedback leads to reflection and self-direction, which can lead to self-directed learning. In such a learning environment, learners can co-construct their meanings as they exchange ideas and knowledge. The literature review suggests a dearth of information on feedback in online or blended learning in the Ghanaian context. Therefore, the

conceptual framework was designed based on the objectives, questions, hypotheses, and theoretical underpinnings of the research to contextualise feedback in a blended learning environment at the University of Ghana. The next section describes the mixed methods approach in detail because most of the literature reviewed focused on quantitative or qualitative designs from the Ghanaian perspective.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter presents the profile of the study context, followed by the philosophical underpinnings of the study; a discussion of the mixed methods research approach; the population target, sample size determination and sampling techniques; the research instrumentation and treatment of the pilot data. Other sections include the actual data collection procedure and how the data was cleaned; credibility and trustworthiness; the regression model specification; reliability, common method bias; exploratory factor analysis; the validity issues of the research; data analysis processes and ethical considerations that underpinned the study. The final section provides a summary of the chapter.

3.2 Study Setting: The Distance Learning Programme at the University of Ghana

Distance Learning was introduced at the UG in 2007 when the university decided to offer undergraduate courses from the then Faculties of Arts and Social Science and Business School to adult learners willing to return to school but were not able to do so in the traditional format (University of Ghana, 2014). In 2008, about 800 students enrolled to pursue Psychology, Economics, Sociology, Geography and Resource Development, and Linguistics courses. Modules were developed for the students for self-directed learning with weekly face-to-face tutorials held at the University of Ghana, Legon campus. Over time, the existing workers' colleges across the ten regions were turned into Centres to accommodate students' tutorials (Adjei, 2014).

The Distance Learning programme was restructured and launched in 2015 and given a blended delivery mode status which is the combination of online and face to face interactions (Aryeetey, 2014). Thus, since its inception in 2007, the distance learning option at the UG has transformed

into a blended learning option with 70% online activities augmented with 30% face-to-face tutorials with the introduction of an LMS, specifically, the Sakai LMS.

3.2.1 The Sakai Online Distance Learning Environment

The Sakai LMS environment enables interaction between students and lecturers. Lecturers upload the course syllabus, reading materials, create hyperlinks to videos and websites to facilitate the learning needs of students. The department produces videos and uploads them on the Sakai LMS. Lecturers also use Assignment, Forum and Chatroom tools to interact with students. Students, in turn, can download these resources or upload assignments and use other learning tools such as Forum (a threaded discussion tool) to interact with lecturers and peers as the need may be. It is expected that each course syllabus is designed in such a way that would allow both learners and lecturers to engage in active teaching and learning. Thus, within the Sakai LMS learning environment, lecturers are expected to provide feedback on learners' work production and learners, in turn, must use the comments on the work to improve the work with an opportunity to resubmit the work or to use the knowledge gained to improve the next learning opportunity. Espasa et al. (2018), argue that when students are allowed to resubmit their work incorporating the suggestions made by their instructors, it increases their desire to use feedback.

Similarly, Sternad (2015) found that feedback provision to students and its usage by students, allow students to improve on their learning at the next given challenging assignment.

3.2.2 The learning context

The pedagogical context of the learning environment is both synchronous and asynchronous through written communication, but mostly it is asynchronous. All resource materials are uploaded by an Instructional Technologist or by the lecturers, and students download them to read.

Learning is mostly self-directed; however, the students can contact their lecturers online (using chatroom, email and WhatsApp). There are also the face-to-face tutorial sessions of the programme which takes place at all the UG Learning Centres in the country. For each course, students meet their tutors three times per semester. Students are expected to do assignments and join forum discussions on the Sakai learning platform as part of the assessment process. Some assignments are completed online, and some presented in the traditional way (such as final examinations) as part of the teaching and learning process. In assessing assignments, lecturers provide feedback. Feedback provision helps meet learning objectives as well as to develop skills among learners. As part of the degree programme, it is required that students take an online mid-semester examination and an end of semester face-to-face examination. The following section outline the philosophy of the study.

3.3 Philosophical Underpinning of the Researcher

The philosophical underpinning for this research is the pragmatic paradigm. Pragmatism is the process of adopting aspects of positivist and interpretive philosophies to undergird the research. Pragmatism allows researchers to adopt methods that help them find answers to research questions that purists approaches are unable to do (Doyle et al., 2009). Also, research trend suggests that combining paradigms leads to credible findings and solutions rather than when one adopts only quantitative or qualitative approaches (Ivankova et al., 2006; Johnson & Onwuegbuzie, 2004). In other words, the researcher takes advantage of the strengths of both objectivity and subjectivity.

This study adopted the mixed methods approach. A mixed methods research is where quantitative and qualitative approaches are combined simultaneously or consecutively (Onwuegbuzie & Collins, 2007). Olsen (2004) and Ivankova et al. (2006) criticised that integrating quantitative and qualitative designs may be problematic if they are perceived from opposing points. Consequently,

Olsen (2004) recommends combining these two paradigms as an interactive approach to research. Integrating the two approaches will deepen the credibility of the research. That is, multiple methods or single elements of both models could be triangulated in research in order to validate the findings (Schoonenboom & Johnson, 2017). Johnson (2017) also stated that integration is crucial in equal weight mixed methods research. According to Schoonenboom and Johnson (2017, p. 110), “mixed methods research ensures ‘multiple validity legitimisation, which refers to the mixed methods research study meeting the relevant combination or set of quantitative, qualitative, and mixed methods validities in each research study”.

Another critique of mixed methods is that it is not possible to use both quantitative and qualitative approaches in a single study because of their distinctive ontological and epistemological stance (Doyle et al., 2009). However, some researchers have questioned this dichotomy as false and that purists’ approaches are on an epistemological continuum with mixed methods broadly in the middle (Johnson et al., 2007). Again, in adopting a mixed-methods approach, this research has tried to comply with those aspects of the conventions within the mixed methods domain. Consequently, using pragmatism for this research is based on the foundation of what works in this educational research.

This is consistent with the arguments made by Addae and Quan-Baffour (2015) that mixed methods paradigm is advantageous for education research in order to avoid the constraints imposed by quantitative or qualitative approaches. In other words, the best way to measure what works is to use a quantitative approach where the measurement is very objective and repeatable. Where the concepts are challenging to measure, then the subjective data gathering was utilised as has been done in the study.

3.4 Research Approach

The choice of mixed methods research approach was because it allows the researcher to take advantage of the strengths of both qualitative and quantitative designs while mitigating their weaknesses (Creswell, 2014; Johnson et al., 2007; Schoonenboom & Johnson, 2017). For example, quantitative data helps to test the hypothesis that was formulated before data collection; it is objective with larger sample size and has higher credibility (Johnson & Christensen, 2004; Nueman, 2014). The insights that the quantitative-qualitative continuum provides are enormous to ignore in that it generates comprehensive information (Schoonenboom & Johnson, 2017). Bryman (2006) asserted that mixed methods research generates a rich set of data that usually researchers find useful in unexpected ways. Thus, the two data sets gathered for the study revealed salient information that is useful for policymaking. It is also emerging as the dominant paradigm in some disciplines (Doyle et al., 2009).

Three basic types of mixed methods research (MMR) have been outlined (Creswell, 2014). They are the convergent parallel, explanatory sequential and exploratory sequential methods. The explanatory sequential mixed method is the choice for this study. Thus, the researcher collected quantitative data, analysed it and then collected qualitative data afterwards to explain grey areas in the quantitative results. In the quantitative-qualitative model, selection of participants is randomly and purposefully carried out and also requires an extended period to undertake (Creswell, 2014; Doyle et al., 2009). The critique of this design is identifying which aspects of the quantitative data to explore further. Thus, using the explanatory sequential approach, the researcher had to develop an eagle's eye to detect those parts of the quantitative dataset that needed to be triangulated with qualitative data to provide validity to the research.

The explanatory sequential mixed method enabled the researcher to triangulate (that is to say to integrate various aspects of both approaches and use one method to confirm or give support to another) or seeks complementarity (a process of enhancing, elaborating or clarifying the results from one approach with the outcomes of another). A reason for adopting the explanatory sequential mixed method is that Johnson and Onwuegbuzie (2004) argue that it is more difficult for one researcher to conduct a concurrent mixed method. Also, the qualitative aspect (which was given a lower weight) helped to explain the experiences of participants better than the quantitative study alone could. In other words, the researcher approached the study using quantitative design first, then triangulated with the qualitative approach. Because any inconsistencies or contradictions resulting from the quantitative analysis were explained through the qualitative aspects of the research, this is important in order to draw firm conclusions and validate the research (Johnson et al., 2007; Schoonenboom & Johnson, 2017). For example, the quantitative results revealed that demographic characteristic in terms of the programme of study significantly associated with learning improvement. The reason was revealed in the focused group discussion results that students had better feedback experiences in some programmes but not in other programmes.

The current research, therefore, triangulated the quantitative and qualitative data collection methods by using survey, focused group discussions and interviews on strengthening and giving credit to the data utilised and to affirm the results produced. For all the objectives stated for this research, some narratives from the qualitative data were used to support or explain aspects that were unclear or inconclusive. For example, participants were asked to share their understanding of feedback and the challenges they experienced when providing or responding to feedback. So, the combination approach for the study enabled the researcher to integrate data collection methods as well as integrate the findings from both data sets to arrive at valid and reliable conclusions that contributed to knowledge. The next section describes the design of the study.

3.5 Quantitative Research Design

The quantitative aspect of the study followed the positivist assumptions by determining relationships between and among variables that emanated from the research objectives, questions and hypotheses. This approach is termed deductive reasoning because the study flows systematically from theory to data with the need to explain relationships between variables (Cohen et al., 2000; Saunders et al., 2016). There are different types of quantitative methods including, surveys, correlational, causa-comparative and experimental research (R. B. Johnson & Christensen, 2004). The survey research design was adopted for the study.

In survey research, large groups of people respond to questions regarding a particular phenomenon in order to measure opinions or attitudes (Badu-Nyarko, 2011; Lancaster, 2005). Thus, the survey involved a sample of distance education students who responded to questions on feedback in online learning within the Ghanaian context. The survey was also cross-sectional because the data was collected once, within a given period (Malhotra & Birks, 2006). A cross-sectional survey, according to Badu-Nyarko (2011), is collecting data from a sample of the general population once, and this may be done in one or multiple days. The data for this research was collected over multiple days.

In collecting the survey data, one challenge that had to be dealt with was whether to study only one programme at Distance Education (DE) or all four programmes. Since it is important to generalise the findings of the research, it became prudent to include all the programmes offered at DE and then sample from this population to ensure adequate representation. Another difficulty faced was which UG Learning Centre to consider since there are ten centres scattered across 10 regions in Ghana. In order to ensure representativeness of the identified population, the researcher deliberated with the Co-ordinators of the UG Learning Centres to ascertain how dense these centres are in terms of the number of students who visit the centres and the programmes. After

careful deliberation on the issue, Accra Learning Centre was chosen as the site for data collection. This is because Accra Learning Centre has the largest number of student enrolment compared to the other nine centres, and most of the students do visit from the other regions. However, to avoid bias, the simple ballot was used to select Koforidua out of the remaining nine centres.

3.6 Qualitative Research Design

The second part of the explanatory sequential mixed methods is qualitative design. Qualitative research methodology seeks a deeper understanding of phenomena (Denzin & Lincoln, 2005) examining subjective views of participants (Abdullahi et al., 2013). The concern here is about the 'why' and 'how' of things and not just 'what', 'where' and 'when?' (Abdullahi et al., 2013; Yin, 2003, p. 1). Thus, the qualitative element of this research was used to explore significant issues such as the understanding of feedback usage in DE online learning as it related to the quantitative survey data. Many researchers who follow quantitative approaches usually conduct some qualitative study by including open-ended questions to get a deeper meaning of the phenomenon, and the goal of this study was to use the qualitative approach to explain the quantitative study.

Since the study adopted a mixed-methods approach, the explanatory qualitative case study design (Abdullahi et al., 2013; Yin, 2003) was useful in assessing the phenomenon of how feedback is used to interact and engage students through the use of LMSs in a changing educational environment. A case study allows the researcher to explore an organisation or an individual through multiple interventions, relationships and programmes (Yin, 2003). The case study approach allowed the researcher to explore the feedback phenomenon in an online learning environment. As Merriam (1998), observed, qualitative case study approach has to do with examining a distinct group in order to obtain an in-depth understanding of their circumstances. Thus, this study explored feedback strategies employed in the Sakai LMSs among level 300 students at the Distance Education Department of the University of Ghana.

The case study approach is also flexible but rigorous, allowing researchers to use multiple data sources (Baxter & Jack, 2008). Multiple data sources such as interviews and focused group discussions were used because this approach is dependable and resilient (Baxter & Jack, 2008) and leads to assuring trustworthiness for the research (Abdullahi et al., 2013). The strategy of triangulating multiple data collection methods ensured that rigorous research was conducted. In other words, the qualitative aspect of the research explained and complemented those of the quantitative aspects. For instance, in assessing a student's work (assignment), an instructor may make comments based on the content, style of presentation or grammar used.

The comments may contain symbols which the student must interpret in order to succeed. Therefore, the qualitative analysis helped to interpret symbolic data better than quantitative analysis could have achieved when used alone. Key informants' experiences were sought to achieve this feature of the research.

3.7 Population

A population is the cluster of people possessing specific attributes that intrigues a researcher, and the population should be relevant for the study because it can positively or negatively influence the research (Asiamah et al., 2017). The population can also be defined as all the members of a group that a researcher desires to find out about in a particular field (Kothari, 2004; Rahi, 2017). For both quantitative and qualitative research, it is necessary to indicate the population (Asiamah et al., 2017).

Given the above definitions, the population for the study comprised all students from the University of Ghana (UG) distance learning centres. The rationale for choosing UG is that, among the public universities, it is only UG that has all programmes at the DE mounted on the Sakai

interface in the country. Although Kwame Nkrumah University of Science and Technology (KNUST) have adopted their Virtual Class, not all the courses have been mounted on the software. Again, the rate at which education technology is deployed in Ghanaian educational institutions appears to be slow before the advent of COVID-19. So, being the oldest university in Ghana, it would be interesting to find out how students have embraced the use of feedback within the Sakai LMS for academic work. UG had recently migrated from KEWL to a new LMS (Sakai) in 2014. Initial discussions with some officials of the university revealed that currently, it is only the UG that has adopted a 70% online teaching and learning augmented with 30% face-to-face for all DE students. Indeed, all the students graduating in 2019/2020 academic year had this stated in their admission letters. This implies that UG would have in place a well-structured ICT and LMS infrastructure that would help achieve the objectives of this research.

3.7.1 Target Population

According to Malhotra and Birks (2006), the target population is a collection of all the people or objects from which the sample is drawn, and it must be adequately defined to achieve significant results. Thus, the target population were made up of all level 300 students studying the four different programmes at the Distance Education Department, University of Ghana (UG) at Accra and Koforidua Learning Centres. The choice for Level 300 was because the focus of the study was to assess the usage of feedback by lecturers and students in the Sakai LMS environment and the level 300 students had been in the DE programme for at least two years. The programmes were Bachelor of Arts (BA), Bachelor of Science in Administration (BSc ADMN), Bachelor of Science in Nursing (BSc NURS) and Bachelor of Science in Information Technology (BSc CSIT). The quantitative sample was thus, drawn from this frame. For the qualitative sample, some of the students from the four different programmes were identified during the quantitative data collection to take part in focused group discussions. Then some of the lecturers teaching courses in these

programmes at level 300 were also included in interviews in order to listen to their viewpoints and experiences about feedback provision and learning improvement in online environments. The lecturers served as key informants.

3.7.2 Sample Size Determination

The sample size is the number of people who take part in a study (Malhotra & Birks, 2006). In determining the sample size for the current research, a simple table constructed from the formula developed by Krejcie and Morgan (1970) was used to arrive at a sample size of 291 with a margin of error of 5% at a confidence level of 95% from a population of 1,223. The 1,223 was obtained from the Academic Office of the College of Education at the University of Ghana for the study.

Thus, from the sample determination table 291, approximately 24% of the total population was identified. Given the fact that 24% is a small sample size considering the population and response rate might be low, the researcher decided to increase the sample size by 10% (Israel, 1992), which then yielded 320 respondents. The formula used in this research is cited by the International Program for Development Evaluation Training (2014). The formula is given below as:

$$n = \frac{X^2 * N * P * (1-P)}{(ME^2 * (N-1)) + (X^2 * P * (1-P))}$$

The interpretation is as follows

n: the size of the sample

X²: the chi-square for a specified confidence

N: is the size of the population

P: is the proportion of the population

ME: is the desired margin of error which is expressed mostly as a proportion

Appendix B displays Krejcie and Morgan's table of sample size determination.

Again, Johnson and Christensen (2004), postulate that in order not to have a smaller sample size when the researcher is in the field, the estimated likely rate of response should be divided by the original sample size which gives the researcher the number of participants to include in the sample. Thus, for a sample size of 320, it is estimated that 85% of the people would volunteer to take part in the research. This is because the researcher adopted the drop and collect later after a lecture on the same day approach for the study.

Therefore, 320 divided by 0.85 yielded an additional 56 respondents, increasing the sample size to 376 people for the survey and thus increasing the sample size by 56 respondents to provide a response rate of 85%. The following formula is derived based on Johnson and Christensen's adjustment of the original sample size.

$$\frac{\text{Desired sample size}}{\text{Proportion likely to respond}} = \text{number of people to include in the original sample}$$

So, $\frac{320}{0.85} =$ approximately 376 respondents to include in the original sample

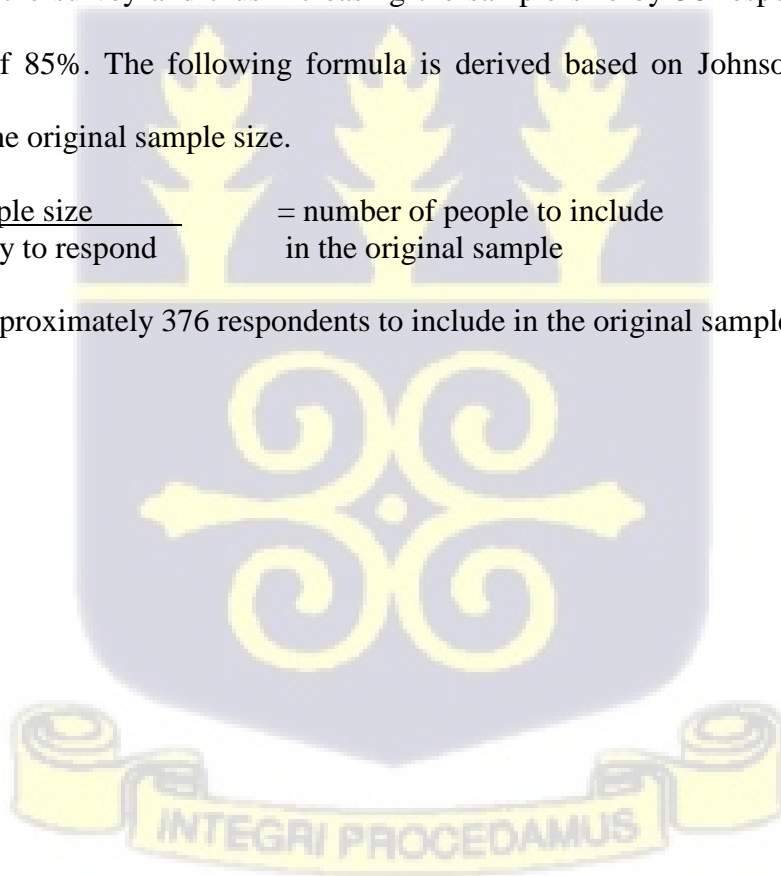


Table 3. 1: Determination of Sample Size to use for the Quantitative Study

Department	Number	Calculation	Sample	Proportionate %	Actual Response
Bachelor of Arts	566	$(376/1223) \times 566$	174	46.2	156
Bachelor of Science in Business Admin	367	$(376/1223) \times 367$	113	30	113
Bachelor of Science in Nursing	258	$(376/1223) \times 258$	79	21	72
Bachelor of Science in Information Technology	32	$(376/1223) \times 32$	10	2.7	13
TOTAL	1223		376	100	354

Source: (Researchers computation based on information received from Academic Affairs Office, 2019)

From table 3.1 above, each stratum has been calculated based on the expected return rate of 0.85%.

3.7.3 Sampling Techniques

The nested sampling technique for mixed methods research was adopted for the study (Addae & Quan-Baffour, 2015). This is because a subset of the quantitative sample was used for the qualitative sample. However, practically, the multi-stage sampling techniques were adopted for the quantitative sample. That is, Level 300 students were targeted for the study because this level of students have been on the programme for more than two years and would be familiar with the terms and usage of the Sakai LMS. Also, they were in level 400 by the time the qualitative data was being collected, thus, eligible to participate. Students taking courses in the four programmes at the Department of DE were the sampling frame. Then samples were proportionately assigned to them based on percentages, and each respondent randomly selected to answer questionnaires.

The DE students were naturally stratified, so the researcher followed this stratification by assigning proportions to the four programmes based on the data from the Academic Affairs Department. BA

was allocated 46.2%, BSc Administration was allocated 30%, then Nursing had 21%, and IT was allocated 2.7%. The allocation for IT is low because there are few students at this level who took the IT programme.

Getting access to the full list is critical in order to make it possible for all the respondents to have an equal chance of selection (Saunders et al., 2016). However, for this research, it was impossible to obtain a full list of students with index numbers from the academic affairs department. Drawing a sample size from the identified sampling frame was to enable the researcher to generalise the findings for this particular population since the respondents possessed homogenous characteristics as the chosen sample. A larger sample size is robust as it generates normal distribution, does not generate spurious results and provides better generalisation (Saunders et al., 2016). However, this might depend on what is being measured and how much of it is intended to be detected at the end of the study.

For the actual data collection, simple random technique via the lottery process was used to select the respondents. A simple random technique is a process in which a definite i number of items are selected in a population in a manner that allows each n item to be included in the sample (Thompson, 2012). So, in each lecture hall, the researcher then wrote 'yes' or 'no', on pieces of paper and passed it around for the respondents to choose. Anyone who chose 'yes' was given a questionnaire to fill. Due to the difficulty to access some of the nursing students as a result of the nature of their work, all those who were available at the time of the study and met the inclusion criteria and were willing to participate were recruited for the study. The researcher and the assistants gave out the questionnaires and left the class until the tutorial was over before they came back to collect them. Furthermore, three weeks prior to the revision period (plus the revision weeks – two weeks) was identified as the best time to collect the quantitative data because this is the period that most of the students go to the campus.

The qualitative data which was needed after the quantitative data had been analysed was collected between September 2019 and February 2020. The qualitative data was carried out in order to explain the experiences of feedback as it is used in the Sakai online environment. It also helped to identify the challenges that the respondents encountered in giving and receiving feedback. The qualitative sampling involved non-probability sampling for the research because it is appropriate for qualitative research. Purposive sampling was used to select some of the Level 300 respondents in the quantitative study, while the snowball technique was used to select the assistant lecturers to participate in the qualitative study. This is because the researcher wanted to find out from these participants their lived experiences with feedback in Sakai LMS and to assure rigour and trustworthiness of the data and results.

Students who had agreed to be part of the focused group discussion were identified and contacted to participate. Thus, three (3) focused group discussions were held. The participants included six Bachelor of Arts, three Bachelor of Science in Business Administration and nine Bachelor of Science in Computer Science and Information Technology students. The Assistant Lecturers and Lecturer, who served as key informants for the qualitative data were five. This is because there were not many of them handling level 300 students. Saunders et al. (2016) argued that a sample size of between 5 to 25 is sufficient for a qualitative study. The adoption of FGD is in tune with Padilla and Benítez (2014). They stressed that the focus groups discussion approach helps researchers to gather the needed evidence directly from the study participants. On the other hand, the interview approach was taken into consideration since the interview method provides the researcher with more reliable and in-depth information for further analysis and discussions (Burino et al., 2017).

The criteria for selection of assistant lecturers was that they should have used the Sakai LMS to interact with third year (level 300) students for at least two years. They should also have been using the discussion tools such as Forum, Chatroom and Meeting tools to exchange information with the students via Sakai LMS. Again, availability sampling was used to select the first participant for the interviews, then snowballing was used for the remaining 4 participants. Availability sampling is used when research subjects are not easily accessible (Amponsah et al., 2018). Appendix C provides a summary of the interview and FGD participants' demographic data.

The study could not have sampled additional lecturers since the participating lecturers were few, just about five of them churning out valuable information for the study. Thus, the research could not determine a saturation stage for the interviews because of the limited number of participants in the qualitative data collection. Saturation means the extent to which no new ideas, information or knowledge is emerging from participants of the study. Therefore, when no new information or ideas are emerging from participants, the data collection would be stopped (Francis et al., 2010). Francis and his colleagues further suggested that researchers should decide how many more data would be collected when no new idea is emerging from participants that were not necessary for this study.

3.8 Instrumentation

A 5-point Likert scale questionnaire was designed by the researcher based on the research objectives to collect the quantitative data set from students. The questionnaire was divided into seven sections. Section one was concerned with the demographic data, while section two (2) had questions on how Sakai LMS was utilised in teaching and learning. Section three (3) was on how the syllabus was designed to integrate feedback-embedded learning outcomes while section four (4) looked at the nature of feedback. In contrast, section five (5) comprised the perception of

formative and interactive feedback. Feedback strategies adopted in Sakai online teaching and learning is in section six (6). The final section (7) focused on questions relating to the relationship between feedback provision and learning improvement variables or dimensions.

For the qualitative data, attention to contextual detail is required in understanding human experiences, and only qualitative research can provide such detailed and informative analysis Ponterotto (2006) because of issues that are too complex to quantify. Thus, the instrument that was used to collect such sensitive qualitative data was the interview guide and focused group discussions (FGDs). The questions that needed to be addressed after the survey data analysis were tools that are used for interaction in Sakai LMS; clarification on the perception of feedback; and nature of feedback usage and the accompanying challenges in the Sakai learning environment. So participants were asked to share their experiences to throw light on the reasons why the respondents gave neutral responses in the survey.

3.8.1 Pilot Study

Pilot testing was conducted at a public university (Kwame Nkrumah University of Science and Technology, Kwabenya Campus) among DE students to help identify problems the researcher could not ascertain from preliminary stages of the questionnaire such as construct validity and item reliability. Though identifying a problem in a questionnaire during pre-testing does not guarantee the success of the procedure, it is a necessary pre-condition used to improve the instrument structure (Perneger et al., 2015). These authors suggested that the starting point for pre-tests of questionnaires of 30 participants is more likely to provide a high power of 80% to detect a problem within the population used. They explained that involving a small sample size, such as seven respondents in a pre-test will only produce narrow outcomes. Therefore, 110 questionnaires were administered to verify whether or not respondents well understood the statements on the study

instrument. The large number of questionnaires tested was to allow the researcher to do a dummy factor analysis as well. Identification of problems such as unclear questions, unfamiliar words, ambiguous syntax, lack of an appropriate answer may lead to alteration of a research instrument and preferably second round of tests (Perneger et al., 2015).

It took three weeks to administer the pre-survey instrument. After administering the questionnaire, 85 were collected, but 81 were cleared and accurate for analysis as the remaining four were incomplete and could not be captured. The pilot data were analysed to test its reliability value using Cronbach alpha reliability score. Results of Cronbach alpha analysis revealed a reliability score of 0.875. However, respondents indicated that some items were not clear enough and had to be restructured. The misunderstanding of some of the questions may have led to the high missing data or no response rates for certain items in the analysis.

The pre-test revealed that statements such as "I do understand all written feedback codes, I have not received any formative feedback on some of my courses, effective feedback on my assignments has made me more analytical" were found to be ambiguous and had to be altered for respondents to understand those words easily. Also, questions about the nature of feedback had to be revised. As a result, the sentences were corrected, and the questionnaire was restructured for post-testing to ensure accuracy and normality of the questionnaire before administering on actual participants.

3.8.2 Post-Test

Due to the observations made during the pre-test, the questionnaire was restructured and post-tested in order to meet the reliability and normality requirements. During the post-test, the researcher administered 60 questionnaires among the same students over two weeks to correct differences noted in earlier responses. Fifty-one (51) questionnaires were retrieved and cleared for

analysis, representing 85% return rate. Except for demographic characteristics of respondents, the researcher divided the research instrument into eight subsections; made up of learning management systems usage among students, syllabus and content delivery, students perception of formative feedback in online learning, feedback strategies, feedback culture, interactive, and feedback and learning improvement.

Reliability tests were conducted to ensure the study variables have internal consistency and measure feedback strategies used in online learning among distance education students. Reliability score of the study instrument was tested using Cronbach Alpha reliability test. Results of the post-test revealed a reliability score of 0.856. The high-reliability score may be due to the restructuring of the questionnaire. Some methodologists recommend minimum alpha coefficient between 0.65 and 0.80 or higher in many cases to be a reasonable justification for conducting research (Johnson & Harris, 2002; Tavakol & Dennick, 2011). Other researchers such as Sekeran and Bougie (2010) posit that the alpha value should be 0.60 or higher to retain an item on an adequate scale. These results are presented in Table 3.2.

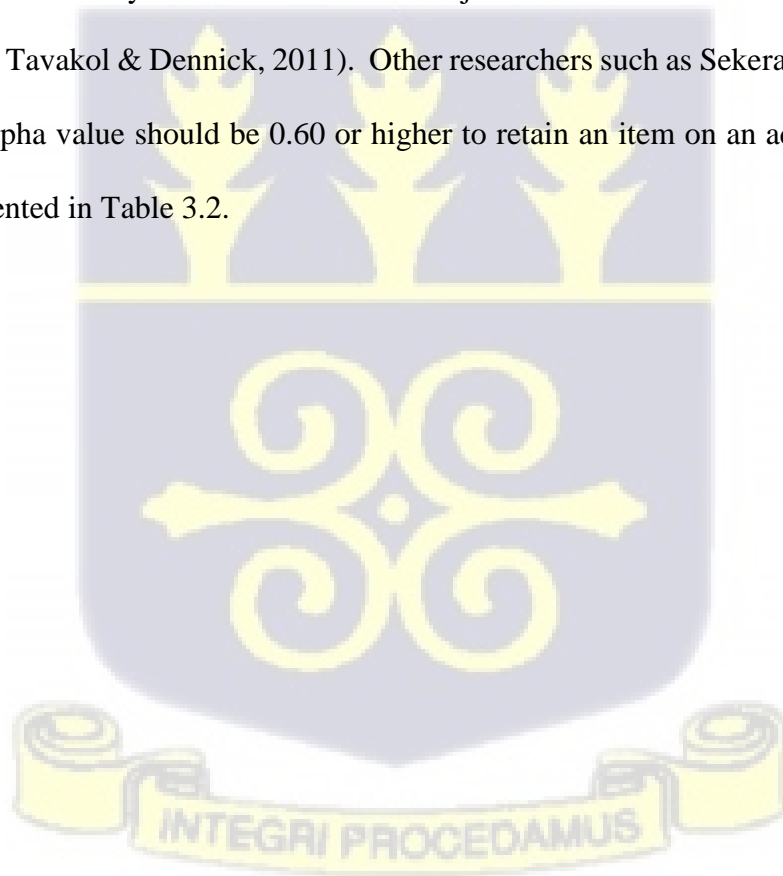


Table 3. 2: Cronbach Alpha Reliability Scores for Post-Pilot

Variables	Number of items	Reliability Score
Use of learning management systems	21	.712
Syllabus and outcomes delivery	6	.426
Student's perception of formative feedback	7	.804
Time, form and type of feedback	7	.742
Nature of comments received	6	.381
How feedback is given in digital learning	13	.795
How student's response to feedback in digital learning	11	.619
Relationship of feedback to skills development	7	.643
Total	78	.856

Source: Field Data (2019)

Based on these, the variables in the study instrument showed reliable results for the actual data to be collected.

3.9 Actual Data Collection Procedure

To determine the types of data collection methods to adopt, the researcher first asked two questions from lecturers of DE courses to ensure that feedback is a concept that is understood among respondents and that the stakeholders were using it. In this regard, only primary data was used for this research. Primary data is the type of data that is generated from the field in order to answer research questions or issues (Malhotra & Birks, 2006). The primary data was collected first hand from the research field sites. The use of questionnaire surveyed the method of primary data collection. The questionnaire was left with the respondents for about two hours and then collected, which implied a drop and collected later technique. The researcher trained three (3) research assistants to help in collecting the survey data.

The assistants were all degree holders and were recruited from the business administration department of the University of Professional Studies Accra. To be an assistant, each person should have been involved in a survey in the past. The training lasted for about four hours. The research was explained to them to prepare them to undertake the fieldwork. The training was also to ascertain their knowledge of the field sites. Finally, they studied the instrument for the pilot data collection as well as when the instrument was reviewed for final data collection. This final step was necessary because the assistants needed to be self-reliant in case it became necessary for them to answer questions.

The actual survey lasted six (6) weeks. To conduct the survey, permission was sought from the Co-ordinators of the DE programme at the University of Ghana Accra and Koforidua Centres of Learning. The Co-ordinators, in turn, introduced the research team to the tutors during the revision and examination period to enable the data collection among the DE level 300 students. In each lecture hall, the reason for conducting the research was explained before the questionnaire were given out to the students. Out of a total of 376 questionnaires administered, 361 were returned, out of which six were not usable making a return rate of approximately 96%.

With the qualitative data, the face-to-face approach was used to collect the data. The interview questions served as a guide to ensure focus while simultaneously allowing participants to explore and to recollect their experiences. The interviews lasted between 50 minutes to 1 hour 30 minutes. Regarding the observation checklists, the researcher sought permission to be enrolled on four courses over a four-week period from four of the lecturers involved in the study in order to observe first-hand (a participant observation) how feedback is provided and what kinds of feedback was given to students as well as which tools helped the process. This type of data was essential to

complement and explain the quantitative data. However, only one Assistant Lecturer enrolled the researcher on the Sakai site for the observation exercise. So, it was excluded from the data analysis.

The combined use of in-depth interviews and focused group discussions that were employed allowed the researcher to pursue the phenomenon of interest in a way that would have gone unnoticed with only a quantitative approach. Multiple sources of data collection used also ensured that the study is rigorous which is necessary to assure credibility (Baxter & Jack, 2008; Denzin et al., 1994; Long & Johnson, 2000). The integration of data sources strengthened the findings as the bricolage unfolded, helping the researcher to understand the phenomena (Baxter & Jack, 2008; Denzin & Lincoln, 2005). Denzin (2003) have identified four (4) types of triangulation including Data Triangulation, Investigator Triangulation; Theory Triangulation; and Methodological Triangulation. This study has adopted data, theory and methods triangulation to ensure the trustworthiness of the data and credibility of the findings.

3.9.1 Cleaning the Data and Addressing Missing Data

In order to conduct the analysis, the data was cleaned, to ensure that the data to be used was accurate to avoid distortions of associations (Tabachnick & Fidell, 2014). Then the non-response rate (missing data) was assessed to ascertain acceptability for analysing the data. Tabachnick and Fidell (2014), argued that when the missing data is not analysed, the data analysis may weaken the generalisations of the findings. Data can be missing completely at random (MCAR), missing at random (MAR) or not missing at random (Bennett, 2001). Missing at random is less severe than non-missing at random (NMAR) data because MARs influence whether the results can be generalised or not and loss of statistical influence (Bennett, 2001; Masconi et al., 2015). Bennett (2001), indicated that when the amount of missing data is above 10%, this will bias the findings. For the current data, the response rate was 94%, and non-response rate or the missing at random

data was less than five per cent; thus, the data was therefore suitable for analysis. Also, it has been proposed that the number of missing participant data should be reported (Akl et al., 2015). Consequently, the number of participants' missing data was six, which is 1.69 per cent. The missing data pie charts can be found in appendix E.

3.9.2 Normality Test

The normality test of distribution data was a crucial statistical tool utilised in this study (Hair et al., 2009). Similarly, normality of the data was tested using the skewness and kurtosis to determine the shape and height of the data distribution (Saunders et al., 2016). Normality tests are standard in scientific research before the data is subjected to sensitive test (East, 2016). The preferred test to determine the normality of data is Shapiro and Wilk's normality test because of its good power properties (Razali & Wap, 2011; Shapiro & Wilk, 1965). The normality test was conducted to detect departures from normality due to either skewness or kurtosis or both (Mendes & Akin, 2009). The skewness of the data enabled the researcher to measure the symmetry and direction to which the data skew (positive, negative or zero) and the kurtosis also helped the researcher to determine the height and sharpness of the central peak, relative to that of a standard bell curve. The data set is considered to be normally distributed when skewness and kurtosis fall between the range -2 and +2 with most of the instruments having higher means (George & Mallery, 2010). SPSS was utilised to test the normality of items, and the findings show that the data was typically distributed which can be found in Table 3.3a and Table 3.3b below.



Table 3.3a: Normality Test for Sakai Management System, Embedded Syllabus, and Feedback Strategy

Items	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
USLMS1	2.08	1.20	0.90	0.13	-0.24	0.26
USLMS2	3.36	1.37	-0.54	0.13	-0.99	0.26
USLMS3	3.27	1.39	-0.44	0.13	-1.13	0.26
USLMS4	2.57	1.36	0.33	0.13	-1.21	0.26
USLMS5	3.48	1.23	-0.63	0.13	-0.52	0.26
USLMS6	3.53	1.28	-0.62	0.13	-0.67	0.26
USLMS7	2.90	1.38	0.00	0.13	-1.24	0.26
USLMS8	4.05	1.15	-1.41	0.13	1.30	0.26
USLMS9	3.61	1.19	-0.66	0.13	-0.37	0.26
USLMS10	3.11	1.15	-0.23	0.13	-0.74	0.26
USLMS11	3.40	1.12	-0.56	0.13	-0.33	0.26
USLMS12	2.95	1.22	-0.07	0.13	-0.94	0.26
USLMS13	2.35	1.21	0.50	0.13	-0.75	0.26
USLMS14	2.59	1.30	0.36	0.13	-1.05	0.26
USLMS15	3.29	1.33	-0.41	0.13	-1.02	0.26
USLMS16	2.64	1.30	0.26	0.13	-1.06	0.26
USLMS17	2.48	1.22	0.32	0.13	-1.00	0.26
USLMS18	2.22	1.24	0.75	0.13	-0.50	0.26
USLMS19	2.28	1.27	0.66	0.13	-0.75	0.26
USLMS20	3.20	1.39	-0.27	0.13	-1.19	0.26
EMS1	2.99	1.25	-0.23	0.13	-1.03	0.26
EMS2	3.38	1.26	-0.58	0.13	-0.72	0.26
EMS3	3.25	1.25	-0.43	0.13	-0.91	0.26
EMS4	2.85	1.34	0.01	0.13	-1.23	0.26
EMS5	2.49	1.39	0.41	0.13	-1.17	0.26
EMS6	3.63	1.33	-0.65	0.13	-0.75	0.26
EMS7	3.72	1.10	-0.88	0.13	0.30	0.26
EMS8	3.20	1.22	-0.29	0.13	-0.75	0.26
FSU1	3.03	1.31	-0.15	0.13	-1.17	0.26
FSU2	2.79	1.23	0.00	0.13	-1.04	0.26
FSU3	3.07	1.28	-0.21	0.13	-1.02	0.26
FSU4	2.67	1.30	0.19	0.13	-1.10	0.26
FSU5	2.81	1.34	0.05	0.13	-1.16	0.26
FSU6	2.44	1.31	0.47	0.13	-0.95	0.26
FSU7	2.14	1.18	0.78	0.13	-0.33	0.26
FSU8	2.45	1.21	0.34	0.13	-0.87	0.26
FSU9	2.87	1.30	-0.04	0.13	-1.16	0.26
FSU10	2.59	1.23	0.26	0.13	-0.98	0.26
FSU11	3.00	1.29	-0.03	0.13	-1.00	0.26

Table 3.3b: Normality Test for Sakai Management System, Embedded Syllabus, and Feedback Strategy

Items	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
FSU12	3.07	1.27	-0.11	0.13	-0.97	0.26
FSU13	3.30	1.22	-0.31	0.13	-0.76	0.26
FSU14	2.63	1.24	0.14	0.13	-1.07	0.26
FSU15	3.02	1.22	-0.20	0.13	-0.92	0.26
FSU16	2.62	1.20	0.29	0.13	-0.81	0.26
FSU17	2.63	1.21	0.21	0.13	-0.95	0.26
FSU18	2.80	1.22	0.01	0.13	-1.00	0.26
NoFU1	2.99	1.25	-0.23	0.13	-1.03	0.26
NoFU2	3.38	1.26	-0.58	0.13	-0.72	0.26
NoFU3	3.25	1.25	-0.43	0.13	-0.91	0.26
NoFU4	2.85	1.34	0.01	0.13	-1.23	0.26
NoFU5	2.49	1.39	0.41	0.13	-1.17	0.26
NoFU6	3.63	1.33	-0.65	0.13	-0.75	0.26
NoFU7	3.72	1.10	-0.88	0.13	0.30	0.26
NoFU8	3.20	1.22	-0.30	0.13	-0.74	0.26
NoFU9	2.89	1.24	-0.01	0.13	-0.93	0.26
NoFU10	2.54	1.09	0.23	0.13	-0.72	0.26
FNLI1	3.15	1.28	-0.21	0.13	-1.01	0.26
FNLI2	3.17	1.22	-0.32	0.13	-0.87	0.26
FNLI3	3.15	1.20	-0.37	0.13	-0.77	0.26
FNLI4	3.27	1.17	-0.61	0.13	-0.51	0.26
FNLI5	3.22	1.19	-0.53	0.13	-0.61	0.26
FNLI6	3.41	1.21	-0.61	0.13	-0.54	0.26
FNLI7	3.47	1.19	-0.66	0.13	-0.37	0.26
FNLI8	3.61	1.17	-0.80	0.13	-0.11	0.26
FNLI9	3.70	1.17	-0.90	0.13	0.04	0.26
FNLI10	3.51	1.14	-0.76	0.13	-0.13	0.26
FNLI11	3.39	1.20	-0.51	0.13	-0.54	0.26
FNLI12	3.40	1.15	-0.52	0.13	-0.42	0.26
FNLI13	3.18	1.17	-0.39	0.13	-0.67	0.26
FNLI14	3.34	1.16	-0.43	0.13	-0.58	0.26
FNLI15	3.18	1.18	-0.31	0.13	-0.79	0.26
FNLI16	3.17	1.15	-0.40	0.13	-0.65	0.26
FNLI17	3.13	1.12	-0.37	0.13	-0.60	0.26
FNLI18	3.19	1.15	-0.44	0.13	-0.66	0.26
FNLI19	3.30	1.13	-0.49	0.13	-0.44	0.26
FNLI20	3.27	1.21	-0.43	0.13	-0.68	0.26

Source: Field Survey, 2019

3.10 Regression Model Specification

In order to ascertain the predictive power of feedback strategies on learning improvement of Distance Education students at the University of Ghana, the study employed standard multiple regression models in the study's analysis. This analytical tool was considered under the assumption that feedback strategies (timing, mode, target, quality and quantity) only, or together with other indicators such as embedded course syllabus and nature of feedback would influence DE student's learning improvement in the regression models developed for the study's analysis.

3.10.1 Estimation Technique

The standard multiple regression analysis was deemed appropriate because, regression analysis allows quantitative researchers to take into consideration other factors, other than the main variables used to predict the dependent variable in a developed regression model (Schmidheiny & Basel, 2013; Schober et al., 2018). This estimation technique was based on prior studies that adopted the use of multiple linear regression in their studies analysis (Schober et al., 2018). Overall, the usage of the typical linear regression in this study confirms Greene (2012) assertion that the multiple linear regression has three essential purposes: predicting, estimating and evaluating hypothesis. The key variables of interest (both dependent and independent variables) used in the regression model are defined as follows:

3.10.2 Multiple Regression Model for Feedback strategies and learning improvement

$$\text{TotalLi} = \alpha_0 + \beta_1\text{FBTiming} + \beta_2\text{FBMode} + \beta_3\text{FBTarget} + \beta_4\text{FBQual} + \beta_5\text{FBQuant} + \sum_i \dots (3.1)$$

Where;

TotalLi = Dependent variable (overall Learning improvement)

β_0 = Constant/intercept: remains constant when all the independent variables are equal to zero.

Independent variables = FBTiming, FBMode, FBTarget, FBQual and FBQuant

$\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 = Coefficients/parameter: measure change independent variable as a result of a unit change in the independent variables

ϵ_i = Error term, representing other variables that were not included in the regression model.

Logistic Regression Model Students' Demographic Characteristics and Learning Improvement

Simple Binary Logistic Regression model

$$P(Y) = \frac{e^{\alpha + \gamma x_1}}{1 + e^{\alpha + \gamma x_1}} \dots \dots \dots (1)$$

$$\ln\left(\frac{p}{1-p}\right) = \alpha + \gamma X_1 \dots \dots \dots (2)$$

Multiple Binary Logistic Regression model

As part of the study's analysis binary multiple logistic regression as suggested by A. P. Field, (2009) was employed to model the relationship between leaning improvement and students' demographic characteristics. There are some assumptions under binary logistic regression which are required to satisfy to give a valid result.

$$P(Y = 1) = \frac{e^{\alpha_0 + \gamma X_1 + \gamma X_2 + \gamma X_3 + \dots + \gamma X_n}}{1 + e^{\alpha_0 + \gamma X_1 + \gamma X_2 + \gamma X_3 + \dots + \gamma X_n}} \dots \dots \dots (3)$$

$$= \frac{1}{1 + e^{-(\alpha_0 + \gamma X_1 + \gamma X_2 + \gamma X_3 + \dots + \gamma X_n)}}$$

Theoretically, it is believed that the regression model in which Y_i (dependent variable) values of the dependent variable are binary is the linear probability model (Senaviratna & Cooray, 2019).

Logit transformation

$$\ln\left(\frac{p}{1-p}\right) = \alpha_0 + \gamma X_1 + \gamma X_2 + \gamma X_3 + \dots + \gamma_n X_n \dots \dots \dots (4)$$

The significance of the logit transformation form of the model is that it portrays linearity in the model's parameters which may range from $-\infty$ to $+\infty$ (i.e. the logit ranges between negative and positive infinity) (Senaviratna & Cooray, 2019), where

P = Probability of the outcome of interest or event (learning improvement)

α = the intercept of the outcome variable

γ = coefficient of the regression model

e = natural logarithm value = 2.71828

x = categorical independent variables [(sex (male/female), age (young/adult), study centre (Accra/Koforidua), and programme of study (social science/natural science)]

3.11 Credibility

3.11.1 Trust Worthiness

Qualitative researchers adopt a wide range of quality standards such as validity, rigour, credibility, trustworthiness and goodness (Denzin et al., 1994; Morrow, 2005). Hammersley (1992, p. 69) provides a qualitative perspective that 'an account is valid or true if it represents those features of the phenomena accurately that it is intended to describe, explain or theorise' cited in (Long & Johnson, 2000). Validity is not the same in quantitative research as it is in qualitative research; neither is reliability the same in quantitative research (Creswell, 2014).

In qualitative research, validity is an indication of accuracy through the laid down procedure, while reliability means resilience that is in agreement with other researchers (Creswell, 2014; Long & Johnson, 2000). This means the stability of the process of measurement. To test for reliability, Long and Johnson (2000) argue that the researcher should audit the decision trail and adopt triangulation. Guba and Lincoln (1994), argued that triangulation might improve the research findings and interpretations. For validity, this means including self-description and reflective journal-keeping; validating participants; long-term involvement; persistent observation; peer debriefing; and triangulation (Long & Johnson, 2000; Nowell et al., 2017).

The current study followed afore-mentioned qualitative principles in order to ensure credibility for the data and research as a whole. To establish trustworthiness, the researcher spent a long time in the field, almost five months. Both individual interviews and focused group discussions were used as data collection triangulation methods. The researcher engaged in peer debriefing with the research assistants by discussing the interview process and taking note of the participants' behaviour. We also, compared notes to ensure that we had the right data. The researcher also debriefed the focused group participants in order to allay their concerns and fears about the outcome of the information they had provided.

Such ethical debriefing was necessary to ensure the psychological well-being of the participants (M. Allen, 2017). Member-checking was performed with the participants on portions of interviews and discussions that needed clarification and kept a reflective diary. Regarding, member-checks, the researcher made several phone calls, sent WhatsApp messages and follow-up visits to seek clarification and validate the qualitative data. The various activities and documentations have all been kept as a research audit trail. To ensure that the findings reflected participants' perspectives

(confirmability), the researcher clearly stated the assumptions of the phenomenon of interest to the participants as the researcher became aware of them.

3.12 Reliability

For this study, the Cronbach Alpha reliability test was used to examine the reliability of the self-constructed instrument. This was to provide statistical confidence for the researcher in order to employ the instrument to answer and test the hypothesis formulated. The Cronbach alpha is expressed between the number 0 and 1 as a measure of internal consistency of a test or a scale. Internal consistency is the extent to which all the items on a scale measure the same concept or construct. Determining reliability also implies whether the instrument can give consistent results under different circumstances.

Table 3. 4: Reliability for Sakai Learning Management

Items	Cronbach's Alpha values	Composite Alpha
		0.82
USLMS1	.82	
USLMS2	.82	
USLMS3	.82	
USLMS4	.81	
USLMS5	.81	
USLMS6	.81	
USLMS7	.81	
USLMS8	.83	
USLMS9	.81	
USLMS10	.80	
USLMS11	.81	
USLMS12	.81	
USLMS13	.80	
USLMS14	.82	
USLMS15	.81	
USLMS16	.80	
USLMS17	.80	
USLMS18	.80	
USLMS19	.80	
USLMS20	.81	

Source: Field Survey, 2019

Table 3.4 reveals the outcome of the Cronbach reliability analysis of the usage of Sakai LMS. All the twenty (20) items analysed produced an alpha of .817 on average proving that internal consistency exists among the items and therefore reliable to measure usage of LMS since it has met the threshold of 0.7 and above (Hair et al., 2013; Taber, 2018).

Table 3. 5: Reliability of Feedback Embedded Course Syllabus

Items	Cronbach's Alpha values	Composite Alpha
		0.75
EMS1	.72	
EMS2	.70	
EMS3	.70	
EMS4	.71	
EMS5	.72	
EMS6	.75	
EMS7	.72	
EMS8	.75	

Source: Field Survey, 2019

Table 3.5 shows the result of Cronbach reliability analysis of feedback as it is embedded in the syllabus used for Distance Education. Indeed, the various Cronbach alpha values presented exceeded the recommended values of 0.75. The outcome of this reliability analysis implies a sufficient power which agrees with Mansour (2015), findings.

Table 3. 6: Nature of Feedback

Items	Cronbach's Alpha values	Composite Alpha
		0.73
NoFU1	0.70	
NoFU2	0.69	
NoFU3	0.68	
NoFU4	0.69	
NoFU5	0.70	
NoFU6	0.72	
NoFU7	0.70	
NoFU8	0.72	
NoFU9	0.73	
NoFU1	0.73	

Source: Field Data (2019)

The results presented in Table 3.6 show the reliability test based on the Cronbach alpha values used to determine the internal consistency of scale items developed to establish specific constructs needed for data analysis. Thus the ten items presented in Table 3.6 were employed to test the reliability of the construct 'nature of feedback'. The results indicate that the composite reliability (alpha = 0.73) for the ten items is above the standard limit of 0.7. This implies that the ten items scale show internal consistency within the 5-point scale used to establish the construct 'nature of feedback'.

Table 3. 7: Feedback Strategies

Items	Cronbach's Alpha values	Composite Alpha
Timing		0.90
FSU1	.91	
FSU2	.90	
FSU3	.90	
FSU4	.90	
Mode		0.90
FSU5	.90	
FSU6	.90	
FSU7	.90	
FSU8	.90	
Target		0.90
FSU9	.91	
FSU10	.91	
FSU11	.91	
FSU12	.90	
FSU13	.90	
Feedback quality/quantity		0.90
FSU14	.90	
FSU15	.90	
FSU16	.91	
FSU17	.90	
FSU18	.90	

Source: Field Data (2019)

Table 3.7 revealed the result of the Cronbach reliability analysis of feedback strategies used in Sakai online learning factor that is considered by students in user feedback. The result showed

composite $\alpha = .90$ for all the sub-constructs. It revealed an internal consistency and an adequate discriminating power.

Table 3. 8: Learning Improvement

Items	Cronbach's Alpha values	Composite Reliability
		0.95
FNLI1	.96	
FNLI2	.95	
FNLI3	.95	
FNLI4	.95	
FNLI5	.95	
FNLI6	.95	
FNLI7	.95	
FNLI8	.95	
FNLI9	.95	
FNLI10	.95	
FNLI11	.95	
FNLI12	.95	
FNLI13	.95	
FNLI14	.95	
FNLI15	.95	
FNLI16	.95	
FNLI17	.95	
FNLI18	.95	
FNLI19	.95	
FNLI20	.95	

Source: Field Data (2019)

Table 3.8 indicates the Cronbach reliabilities of feedback and learning improvement of students at UG Distance Education. It is recorded that all the 20 items indicated an alpha of .952 indicating that it has met the cut-off point of 0.7 and above. Subsequently, Table 3.8 reveal that the Cronbach alpha values are over and above the recommended value of 0.7. In other words, it can be concluded that there is internal consistency among the items with sufficient discriminating power (Hair et al., 2013; Mansour, 2015).

3.13 Common Method Bias

Common method bias occurs when a measurement fails to measure the constructs it was meant to measure, thereby, creating an error in internal consistency (Podsakoff et al., 2003). For this research, the total variance extracted was less than 50 or 23.888. It means that there is no variance or bias in the data coming from the cross-sectional survey. The data used is bias-free. The information on common method bias can be found in Appendix F.

3.14 Exploratory Factor Analysis

When a researcher needs to find out whether certain factors influence the variables or the structure of a factor, they will conduct an exploratory factor analysis (EFA) (Schumacker & Lomax, 2010; Tabachnick & Fidell, 2014). Sometimes, it is used as a reduction method that is, taking out items that reduce associations between variables (DiStefano et al., 2009). The EFA was done using the principal components analysis with the varimax rotation to identify the factors that influenced the variables used in this study. The full EFA is discussed in Tables 3.9 to Table 3.11.

Table 3. 9: Rotated Matrix Sakai Learning Management

Items	Loadings	Eigen Values	%Variance	Cumulative % of variance
SLM		20.10	11.54	15.81
USLMS3	0.83			
USLMS2	0.82			
USLMS18	0.81			
USLMS5	0.77			
USLMS19	0.77			
USLMS13	0.76			
USLMS6	0.76			
USLMS9	0.74			
USLMS17	0.73			
USLMS11	0.70			
USLMS20	0.65			
USLMS16	0.56			

Source: Field Data (2019)

Table 3. 10: Rotated Matrix for Embedded, Nature, Strategy, and Learning Improvement

Items	Loadings	Eigen Values	% of variance	Cumulative % of variance
EMS		4.64	6.75	24.06
EMS4	0.75			
EMS6	0.73			
EMS7	0.73			
EMS2	0.72			
EMS3	0.69			
EMS1	0.66			
EMS5	0.63			
EMS8	0.58			
NoF		4.17	5.81	31.70
NoF10	0.82			
NoF6	0.78			
NoF4	0.76			
NoF9	0.74			
NoF7	0.73			
NoF2	0.72			
NoF3	0.69			
NoF1	0.64			
NoF5	0.63			
FSU		2.47	5.66	39.12
FSU2	0.77			
FSU11	0.75			
FSU13	0.75			
FSU7	0.75			
FSU6	0.75			
FSU8	0.74			
FSU17	0.73			
FSU12	0.72			
FSU16	0.72			
FSU9	0.72			
FSU10	0.71			
FNLI		2.30	3.90	44.28
FNLI2	0.64			
FNLI3	0.68			
FNLI4	0.67			
FNLI5	0.72			
FNLI6	0.77			
FNLI7	0.74			
FNLI8	0.69			

Source: Field Data (2019)

Table 3. 11: Rotated Matrix for Learning Improvement

Items	Loadings	Eigen Values	% of variance	Cumulative % of Variance
FNLI9	0.74			
FNLI10	0.77			
FNLI11	0.73			
FNLI12	0.68			
FNLI13	0.61			
FNLI14	0.70			
FNLI15	0.70			
FNLI16	0.66			
FNLI17	0.62			
FNLI18	0.72			
FNLI19	0.69			
FNLI20	0.60			

Source: Field Data (2019)

Of the 20 items for Sakai LMS (Table 3.10), 12 loaded and eight did not load. This encouraged or motivated them to use the Sakai LMS to interact with their lecturers and with one another. In Table 3.10, all the items for Embedded Syllabus loaded. As exhibited in Table 3.10, nine out of ten statements on the nature of feedback loaded for the construct. Table 3.10 revealed that 11 items loaded out of 18 items form Feedback Strategies.

Further, out of the 20 items of learning improvement, 19 variables loaded, of which one (i.e., FNLI1) was deleted. In all, the loaded items met the threshold of 0.5 as expound by Fornell and Larcker (1981). Again, the tables show a total variance explained by the factors extracted. A total of 44.28% variance was explained. Sakai Learning Management had 15.18%, Embedded Course Syllabus had 24.06%, Nature of Feedback had 31.70%, Feedback Usage Strategy had 39.12%, and finally, Learning Improvement scored 44.28%. Average maximise validity was utilised to determine the factors of each construct (DiStefano et al., 2009). Additionally, all the factor loadings met the threshold of 0.5. Therefore, these instruments were used for further regression analysis.

3.15 Validity

Validity is about whether the instruments the researcher is using for research is doing what it is meant to do (A. Field, 2005). There are various types of validity. Content validity is ascertained when experts scrutinise, for example, an instrument for measurement (Der Kiureghian et al., 2006). Thus the questionnaire for the survey as well as the interview guide was peer-reviewed through criticisms and re-organisations by the researcher's three supervisors and colleague lecturers.

3.15.1 Convergent and Discriminant Analysis

Again, during the EFA, convergent validity was conducted. It is postulated that high factor loadings and high composite reliability scores are evidence for convergent validity. Thus, if the AVE is more significant than 0.5, then convergent validity is present (Hair et al., 2013). All the scores were greater than 0.5, which implies that there is convergent validity in the constructs. Furthermore, discriminant validity was conducted by calculating the square root of the AVEs, which were greater than their correlations.

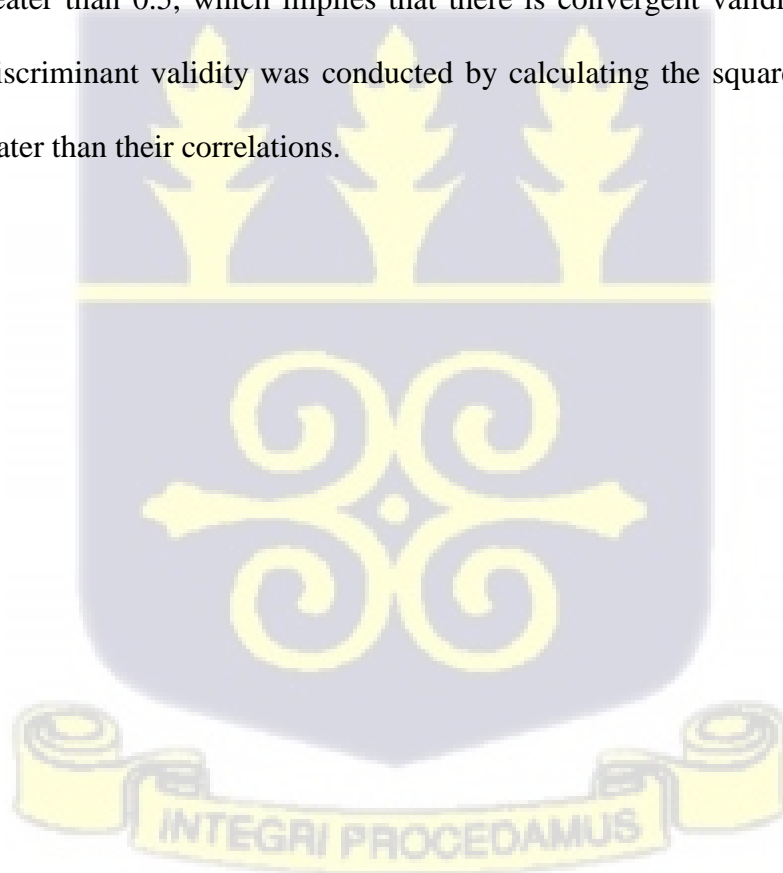


Table 3.12: CR, AVE, and Inter-factor Correlation (Convergent and Discriminant Validity)

Constructs	CR	AVE	1	2	3	4	5	6	7	8
SLMS	0.930	0.720	0.849							
ECS	0.850	0.690	0.606**	0.831						
NoF	0.730	0.720	0.538**	0.623**	0.849					
FSUT	0.770	0.740	0.490**	0.530**	0.494**	0.866				
FSUM	0.760	0.740	0.534**	0.480**	0.470**	0.487**	0.866			
FSUTG	0.770	0.740	0.583**	0.463**	0.469**	0.383**	0.595**	0.866		
FSUQ	0.800	0.750	0.514**	0.424**	0.453**	0.351**	0.541**	0.609**	0.866	
FNLI	0.870	0.620	0.534**	0.470**	0.469**	0.487**	0.495**	0.595**	0.607**	0.787

1. Sakai LMS (SLMS)
2. Embedded Course Syllabus (ECS)
3. Nature of Feedback (NoF)
4. Feedback Strategies used, Timing (FSUT)
5. Feedback Strategies used, Mode (FSUM)
6. Feedback Strategies used, Target (FSUTG)
7. Feedback Strategies used, Quality/Quantity (FSUQ)
8. Feedback and Learning Improvement (FNLI)

Source: Field Data (2019)

3.16 Data Analysis Methods

Two types of datasets (quantitative and qualitative) were used for the analysis. The quantitative dataset stemmed from responses received from the administration of closed-ended questionnaire while the qualitative dataset were narratives from interviews and focused group discussions. Based on the items on the questionnaire and the research objectives, the quantitative analysis was divided into two: descriptive and inferential statistics. The descriptive data analysis comprised frequencies, percentage, means and standard deviations. The inferential statistics were performed using multiple regression and logistic regression analysis to test the hypotheses. Exploratory factor analysis was also conducted to ascertain the reliability of the constructs used in the instrument.

The qualitative dataset was derived from the interviews and focused group discussions. The recorded data from interviews and focused group discussions were transcribed verbatim and confirmed with participants to check whether their views have been clearly and accurately

captured. Furthermore, the transcribed data were coded, and themes were drawn out for interpretation. This procedure of data analysis is congruent with the literature describing qualitative data analysis to involve transcription, then coding to describe the people or situation, then develop "themes", then construct the themes into narratives, and finally, interpret the data and then write the final report (Braun & Clarke, 2012; Creswell, 2014; Yildirim et al., 2014). Corbin and Strauss, (2008) argued that coding the data appropriately raises it to a conceptual level. The researcher used both the quantitative and qualitative results to improve the conceptual model in the final analysis.

Creswell (2014), suggested that qualitative data collection and analysis should be done together when one is conducting a qualitative study. In other words, the data collection and writing were done in succession.

Unlike the quantitative research where the researcher followed a systematic approach to data collection, analyse and write-up, qualitative researchers analyse data whiles collecting it as well as structuring the final document (Creswell, 2014). For the current research, the interviews were transcribed as and when the data were collected as the information was fresh in mind. The recorded data was transcribed as soon as it was collected so that the researcher would not forget or miss out important information that has been recorded. Thus, for the qualitative dataset, the simultaneous data analysis technique was adopted.

All qualitative transcripts were read through several times in order to get a good feel or grasp of the data. After the detailed readings, the data were described, classified and interpreted (Braun & Clarke, 2012; Nowell et al., 2017). During these processes, themes, which involved reducing the data set into meaningful segments and assigning names to these segments, were done to the various categories identified within the data. Subsequently, the codes assigned were combined into broader

categories or themes, and interpretation was conducted concerning the existing literature. The NVivo 12 software for analysing qualitative data was used for this research as it helped to organise and code the transcribed data for further analysis. Adopting such software also reduced the time the researcher would have used to analyse all the data manually.

3.17 Ethical Considerations

The researcher sought and received clearance from the Ethics Committee of Humanities at the University of Ghana (see appendix D). All the necessary protocol requirements have been sought and approval received. The researcher also sought consent from the participating department in order to involve the Assistant Lecturers and to have access to their Sakai LMS data. Also, primary participants consent was sought in order to record their views on all questions that they provided. Before proceeding to collect the data, the researcher explained the purpose of the research to all the participants and trusted that they would voluntarily provide the needed answers on the questionnaires as well as those questions that were asked later in the interview sessions.

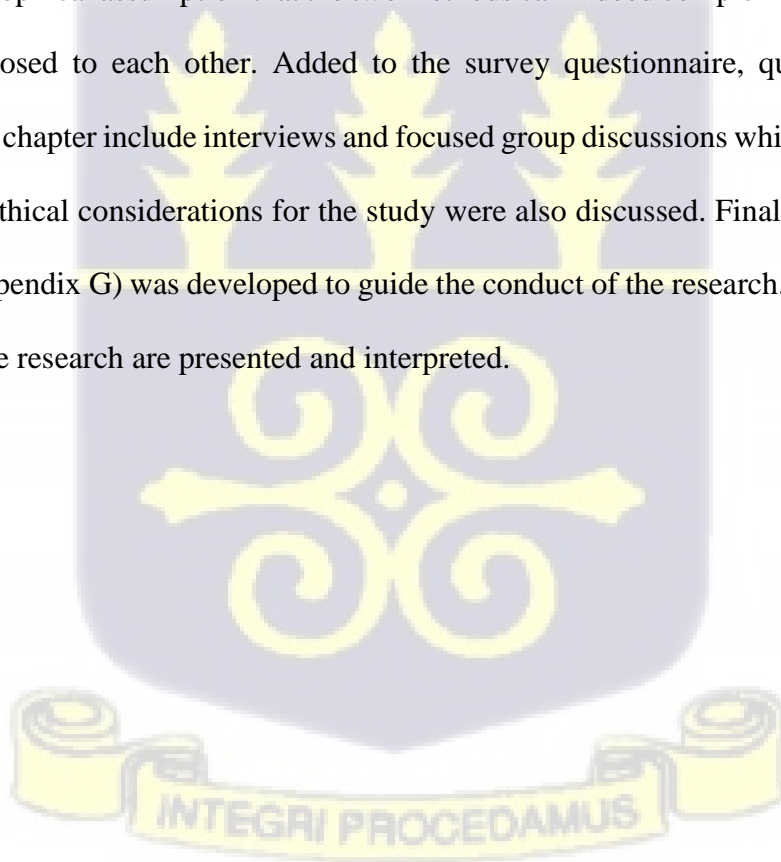
The supervisors of the research agreed with the researcher on the nature of the questions in order to avoid offensive, harmful, disrespectful and unpleasant questions. The participants were informed that the research was purely for academic purposes to assure confidence and that their information will be treated as confidential. A consent form was given to each participant to read and understand before participating in the research. Each participant who agreed to be part of the research did voluntarily and signed the consent form provided.

Furthermore, the participants were approached at their convenience to collect the data. Given this, the researcher allowed the participants to freely opt-out if they did not want to participate in the research which some of them did. Not a single respondent was forced to participate. They were assured anonymity. The research team for qualitative data were debriefed after the focused group,

and interview data had been transcribed for the accuracy of the data. Member checking was employed to allow participants to provide salient information about responses based on the initial interviews. The member checks were done via phone calls, WhatsApp and a few return visits to the research site.

3.18 Summary of Chapter

The methodology for the research was laid out. It touched on the fact that the research adopted pragmatism because of the phenomenon under investigation needed to be objective while at the same time considering the participants' lived experiences of feedback usage in DE hybrid learning. Due to the setting of the research problem, the research objectives and questions, a multiple research approach was utilised through the adoption of both quantitative and qualitative techniques under the philosophical assumption that the two methods can indeed complement each other, rather than being opposed to each other. Added to the survey questionnaire, qualitative techniques discussed in the chapter include interviews and focused group discussions which were thematically analysed. The ethical considerations for the study were also discussed. Finally, a methodological framework (Appendix G) was developed to guide the conduct of the research. In the next chapter, the results of the research are presented and interpreted.



CHAPTER FOUR

PRESENTATION OF RESULTS

4.0 Introduction

This chapter dealt with two datasets, the quantitative and the qualitative data. The chapter was structured following the objectives and hypotheses of the study. The first part dealt with the demographic characteristics of respondents. Percentages and frequencies were used to describe the demographic data about feedback strategies and learning improvement; as well as the means, standard deviation, logistic and regression analysis and testing of the hypotheses. The second part reports the qualitative results presented in narratives.

First Phase: Quantitative Results

4.1 Personal Information and Demographics

This research captured data on the gender, marital, employment, age, programme, and centre of the participants as a means of providing insight about the demographic feature of the respondents.

Table 4.1 illustrates.

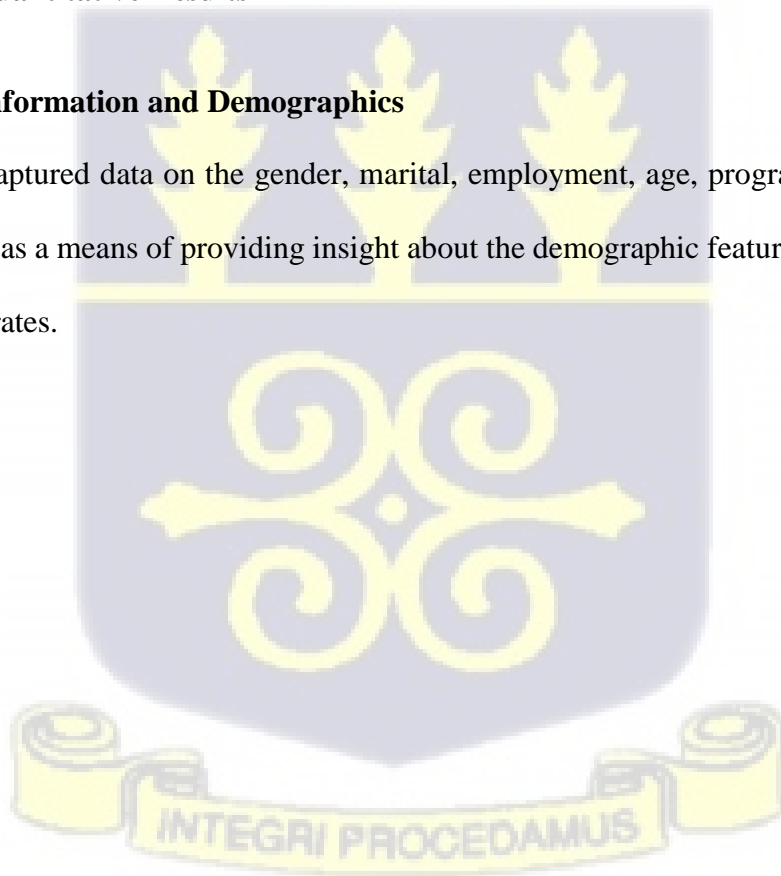


Table 4. 1: Demographic Characteristics

Gender	Frequency	Per cent (%)
Male	157	44.2
Female	198	55.8
Total	355	100.0
Marital Status		
Single	295	83.1
Married	57	16.1
Divorced	1	.3
Separated	2	.6
Total	355	100.0
Employment Status		
Employed	167	47.0
Self-Employed	52	14.6
Unemployed	136	38.3
Total	355	100.0
Age		
17-22 years	68	19.2
23-27 years	163	45.9
28-32 years	99	27.9
33-37 years	22	6.2
38-42 years	2	.6
43-50+ years	1	.3
Total	355	100.0
Programme		
BA	157	44.2
BSc ADMIN	113	31.8
BSc NURSING	72	20.3
BSc INFOTECH	13	3.7
Total	355	100.0
Centre		
ACCRA	334	94.1
KOFORIDUA	21	5.9
Total	355	100.0

Source: Field Data, 2019

In Table 4.1, it can be observed that approximately 44% (151) respondents were males with the remaining 56% (198) being females. The result indicates that overall, there were more females than males.

With response to the marital status of the participants, approximately 83% (295) respondents were single, 16% (57) participants were married, less than one per cent or two respondents were

separated, while one person who accounted for (0.3%) was divorced. This clearly shows that the majority of the participants sampled were single.

Again table 4.1 revealed that 166 respondents were employed, while 52 of the respondents were self-employed constituting a total of approximately, 65% (218) employed participants. Moreover, about approximately 38 per cent were unemployed. Therefore, the empirical result shows that most of the respondents were employed. The result is justifiable because employment is an essential factor for most distance students, and they enrol so that they could upgrade their skills and become relevant in the job market. This result further revealed that it is not only workers who enrol on the DE programme at the University of Ghana but also those who are unemployed.

In response to the age bracket of the respondent, the results in table 4.1 showed that approximately 46% were between the ages of 23-27 years, 28% were between 28-32 years, 19% were between 17-22 years, close to 6% were between 33-37 years, around less than one was between 38-42 and 43-50+ years respectively. Overall, the highest age group was that of 22-27 years. Interestingly, it can be deduced from Table 4.1 that a higher number of respondents (342), making 96.3 per cent of the respondents (17-37) are in their productive years. This means that students need useful feedback in the teaching and learning process that will lead to critical thinking skills as they engage with the concepts introduced to them. Thus, acquiring the degree will improve their chances of contributing to national development as well as improve their economic status.

Concerning the programme pursued by the participants, Table 4.1 depicts the categorisation of the responses to the asked demographic question. Close to approximately 44% were pursuing BA, almost 32% were studying BSc ADMIN, about 20% were BSc NURSING students, and the

remaining four per cent were pursuing BSc INFOTECH. This is an indication that the majority of the participants sampled were BA students.

4.2 Descriptive Statistics

The study utilised descriptive statistics to enhance data summarisation based on raw score, characteristics of the respondents and indicate the sample size used. That is, it helped the researcher to have confidence and know the path of the raw data using the mean, the average mean score, and standard deviations as suggested by Garson (2012). In this study, the descriptive statistics are presented as frequencies, mean scores, an average of averages, and standard deviation within the study context.



Table 4. 2: Descriptive Statistics for Sakai Learning Management

Codes	Constructs/Items	Mean	Std. Dev.
USLMS1	I knew how to use LMS before enrolment into the programme	2.08	1.20
USLMS2	I received training on how to use the Sakai LMS before using it	3.36	1.37
USLMS3	I have received training on how to use Sakai LMS only once	3.27	1.39
USLMS4	I received other training sessions while on my programme	2.57	1.36
USLMS5	Course outcomes are communicated through Sakai LMS	3.48	1.23
USLMS6	I download all resources (study materials) through Sakai LMS	3.53	1.28
USLMS7	I use recommended links in Sakai LMS to access videos	2.90	1.38
USLMS8	I am able to take quizzes online	4.05	1.15
USLMS9	I am able to participate in threaded discussions using forum portal in LMS	3.61	1.19
USLMS10	I check calendar and announcement tools regularly	3.11	1.15
USLMS11	I visit the Chatroom to join conversations of academic interest to me	3.40	1.12
USLMS12	My lecturers ask us questions through the polls tool	2.95	1.22
USLMS13	My lecturers use wikis and blog tools to interact with me	2.35	1.21
USLMS14	I struggle to navigate the Sakai learning interface	2.59	1.30
USLMS15	I receive individual assignments per course in a semester through Sakai LMS	3.29	1.33
USLMS16	I work with more than one online group per course in a semester	2.64	1.30
USLMS17	My lecturers/tutors use drop-box to interact with me or my group	2.48	1.22
USLMS18	My colleagues and I use blogging in Sakai to discuss assignments	2.22	1.24
USLMS19	I use drop-box in Sakai LMS to collaborate with my colleagues	2.28	1.27
USLMS20	My lecturers/tutors use email in Sakai to contact me or send me relevant information	3.20	1.39
Total Av	Sakai Learning Management	2.97	1.27

Source: Field Survey, 2019

Table 4. 3: Descriptive Statistics for Embedded Syllabus

Codes		Mean	Std. Deviation
EMS1	The syllabus clearly shows that feedback would be provided as part of the course delivery	2.99	1.25
EMS2	Lesson objectives are explained to me at the beginning of the semester	3.38	1.26
EMS3	Lesson objectives are explained to me at the beginning of every lecture	3.25	1.25
EMS4	I know the criteria through which my assignments will be assessed or marked	2.85	1.34
EMS5	Every topic in online syllabus is covered by the end of the semester	2.49	1.39
EMS6	Some of the topics to be covered are too much for one semester	3.63	1.33
EMS7	Topics in the syllabus are relevant for knowledge acquisition in my programme	3.72	1.10
EMS8	I ask questions about topics that are not clear in the syllabus	3.20	1.22
Total Av	Embedded Syllabus	3.19	1.27

Source: Field Survey, 2019



Table 4. 4: Descriptive Statistics for Feedback Strategies

Codes	Feedback Strategies	Mean	Std. Deviation
FSU1	Guidelines are given before the assignment is produced	3.03	1.31
FSU2	Comment is given as the assignment progresses	2.79	1.23
FSU3	Comment is given after the assignment is produced	3.07	1.28
FSU4	I am given feedback on my assignments early in the semester	2.67	1.30
Total Av	Timing	2.89	1.28
FSU5	I receive written comments from my tutor/Lecturer through Sakai	2.81	1.34
FSU6	I receive electronic (audio or video) feedback from my lecturers/tutors through Sakai	2.44	1.31
FSU7	My lecturers use symbols and diagrams when commenting on my work	2.14	1.18
FSU8	Written comments are tracked on my assignments	2.45	1.21
Total Av	Mode	2.46	1.26
FSU9	My lecturers give comments on my work in Sakai	2.87	1.30
FSU10	My peers also comment on my work through Sakai	2.59	1.23
FSU11	I prefer marks more than my Lecturer's comments on my work	3.00	1.29
FSU12	I prefer comments more than the marks I receive for work done	3.07	1.27
FSU13	I prefer individual feedback to group feedback	3.30	1.22
Total Av	Target	2.97	1.26
FSU14	I receive elaborated comments (this has to do with information on how to improve, change and avoid common errors)	2.63	1.24
FSU15	Feedback that I receive seeks to further develop my understanding of concepts I have been introduced to	3.02	1.22
FSU16	I wait until revision week before I ask questions on concepts, I did not understand during online sessions	2.62	1.20
FSU17	My lecturers/tutors give comments regularly on written assignments	2.63	1.21
FSU18	Comments on my assignments describe the work and the processes I used to do the work	2.80	1.22
Total Av	Feedback Quality/Quantity	2.74	1.22

Source: Field Survey, 2019



Table 4. 5: Descriptive Statistics for Nature of Feedback

Codes	Nature of Feedback	Mean	Std. Deviation
NoF1	Feedback I received from my lecturers is trans missional or one way	2.99	1.25
NoF2	Feedback I received from my lecturers is directional	3.38	1.26
NoF3	Feedback I received is only dialogic (two way)	3.25	1.25
NoF4	Feedback comments we used in distance education is interactive	2.85	1.34
NoF5	Feedback I received from lecturers provides suggestions on how to approach the assignment	2.49	1.39
NoF6	Feedback comments I receive tells me what to do rather than question my opinions or ideas	3.63	1.33
NoF7	Feedback comments I received on my assignments are corrective	3.72	1.10
NoF8	Feedback comments are mostly in the form of praise	3.20	1.22
NoF9	The feedback comments from my lecturers direct me to expand or explore my ideas further	2.89	1.24
NoF10	My Lecturer's comments question my opinions and direct me to look at others	2.54	1.09
Total Av		3.09	1.25

Source: Field Survey, 2019

Tables 4.2 to 4.5 show the factors that best explain learning improvement. Out of the seven (7) constructs, the feedback embedded course syllabus was the best factor that explained online learning improvement which accounted for mean score of 3.19, followed by nature of feedback which recorded an average score of 3.09. Further, Sakai LMS and feedback target had 2.97 average mean scores each, respectively. Feedback timing and feedback quality/quantity also recorded an average value of 2.89 and 2.74, respectively. In all, the respondents were of the view that the factor that best explains learning improvement among distance education was feedback embedded course syllabus. It therefore, implies that a well-designed course syllabus will communicate the feedback objectives to students when they submit their online assignments. Also, completing the syllabus may be necessary for employees who need to acquire specific knowledge as they return to impact their workplace.

4.3 Research Objectives

4.3.1 Objective One: Perception of formative and interactive feedback usage.

Table 4. 6: Descriptive Statistics for Students Perceptions

Codes	Constructs/Items	Mean	Std. Deviation
SPFF1	I understand that feedback is not only about mark obtained	3.56	1.13
SPFF2	Comments on my work guide me to avoid mistakes or to understand concepts in my assignments better	3.52	1.17
SPFF3	The comments I receive on my online assignments cause me to think and produce better work next time	3.51	1.21
SPFF4	Comments on my work give opportunities to gauge my learning and improve my understanding	3.52	1.21
SPFF5	Feedback from peers and lecturers helps me plan how to organise my studies	3.57	1.15
SPFF6	Feedback I receive online allows me to set goals that help me to monitor my learning	3.45	1.19
SPFF7	I anticipate comments when I submit my assignments	3.45	1.25
Total Av	Students Perception of Formative Feedback	3.51	1.19
IPFU1	My lecturers/tutors engage with me online based on the feedback they provide on my assignments or tasks	2.63	1.23
IPFU2	My courses are structured to allow my colleagues to provide feedback on my online tasks/assignments	2.69	1.23
IPFU3	Comments from my colleagues lead to my understanding of specific topics in my course	3.14	1.18
IPFU4	I use comments from peers because they are knowledgeable	3.03	1.16
IPFU5	I receive feedback from my peers during online discussions	3.06	1.21
IPFU6	My peers provide useful information during forum discussions that I use to improve my learning	3.35	1.14
IPFU7	I carefully analyse information from peers to help me to improve my learning and performance	3.48	1.13
IPFU8	I am given the opportunity to assess my colleagues' online submissions (either in Forum, assignments or Chatroom)	2.90	1.32
Total	Interactive Feedback	3.03	1.20

Source: Field Survey, 2019

Descriptive statistic was utilised to ascertain the perceptions of students towards formative and interactive usage at the department of distance education. The findings in Table 4.6 show that out of the two constructs, students' formative feedback recorded an average mean score of (mean=3.51;

SD=1.19). Interactive feedback accounted for the lowest average score of (mean=3.03; SD=1.20). The result is an indication that the majority of the sampled students agreed that formative feedback usage at the distance learning programme is more important than interactive feedback. It signifies that formative feedback usage is a relevant factor that explains student's perception towards online learning. Furthermore, a critical observation of the averages of formative feedback recorded (mean=3.5; SD=1.19) and above meaning that all the students affirmatively responded to all items in this construct, which confirm that formative feedback is vital for online learning.

4.3.2 Objective Two: Provision of feedback in online interaction between lecturers and students.

Table 4. 7: Nature of Feedback between Lecturers and Students

Items	Mean	St. Deviation
Statements		
Feedback I received from my lecturers is transmission-based or one way	3.56	1.25
Feedback I received from my lecturers is directional	3.52	1.26
Feedback I received is only dialogic (two way)	3.51	1.25
Feedback comments we used in distance education is interactive	3.52	1.34
Feedback I received from lecturers provides suggestions on how to approach the assignment	3.57	1.39
Feedback comments I receive tell me what to do rather than question my opinions or ideas	3.55	1.33
Feedback comments I received on my assignments are corrective	3.55	1.10
Feedback comments are mostly in the form of praise	3.78	1.22
The feedback comments from my lecturers direct me to expand or explore my ideas further	3.98	1.24
My Lecturer's comments question my opinions and direct me to look at others	4.11	1.09
Total Av	3.67	1.25

Source: Field Survey, 2019

Table 4.7 shows the opinions of students on some statements regarding the nature of feedback existing in the various distance education online programmes. That is, the average of averages was utilised, that improves the interaction between students and lecturers.

It can be inferred from Table 4.7 that total average score of (mean=3.67; SD=1.25) is an indication that the participants agreed to the stated items. That is, information received from lecturers were transmission-based, directional, interactive, suggestions are given, information received tells me what to do, assignments are corrective, comments are mostly in the form of praise, advice to explore further, and directed to look at others). In other words, the students agreed that the nature of feedback is more directional and transmission-based than dialogic.

4.3.3 Objective three: Influence of demographic characteristics on learning improvement.

Logistic Regression Analysis

The study employed a logistic regression analytical tool to examine the likelihood that students' demographic characteristics would improve their learning outcomes. Among the key demographic characteristics that were treated as independent dichotomous variables include sex, age, study programme and study centre. On the other hand, learning improvement coded as dichotomous (not improved = 0; improved = 1) was treated as the dependent variable in the logistic regression model. The results of the logistic regression output generated by SPSS are presented in Table 4.8.

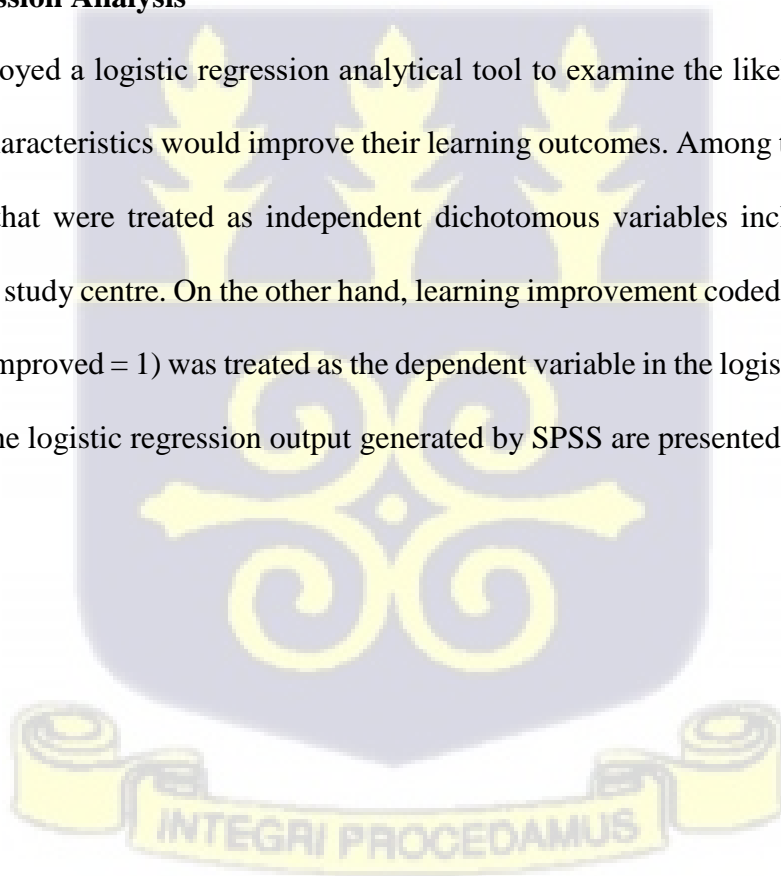


Table 4.8: Logistic Regression output for Distance Education Students' Learning improvement

	Variables in the Equation					
	β	SE (β)	Wald (χ^2)	df	Sig.	Exp(β) Odds ratio (e^β)
Sex (female = 0; male =1)	-.058	.260	.049	1	.825	.944
Age (adult= 0; young = 1)	1.072	.313	11.753	1	.001	2.922
Programme (N.Sci = 0; S.Sci = 1)	.103	.332	.096	1	.756	1.108
Centre (K'dua = 0; Accra =1)	.338	.584	.334	1	.563	1.402
Constant	.797	.208	14.636	1	.000	2.220

a. Variable(s) entered on step 1: Sex, Age, Programme, Centre

Dependent variable (Learning improvement = not improved = 0; improved =1)

e^β = the base of the natural log raised to the power β . (i.e. natural log base e , = 2.71828)

Source: Field Survey, 2019

The logistic regression was employed to test the hypothesis that there is the likelihood that learning improvement of distance education students is related to their demographic characteristic (sex, age, the programme of study and study centre). The results (Table 4.8) show that the likelihood of students' learning is improved had negatively non-significant ($\beta = -.058$; $df = 1$; p -value = .825) relationship with their sex. The results further indicate that male distance education students were 0.944 more likely to have their learning improved than their female counterparts. This implies that the likelihood of being a female distance education student and having less improved learning outcome is high.

Besides, the results depict that students' age (i.e. being older adult or younger adult) was a positive statistically significant predictor of learning improvement. However, being a younger adult distance education student was 2.922 more likely to have his or her learning improved than an older adult. More so, it is observed from Table 4.8 that although student' programme of study and study centre was found to be statistically non-significant predictors of learning improvement, their odds ratios predicted by the model show appreciable differences. For instance, the model predicts that the likelihood of social science students having their learning improved was 1.108 times higher

than natural science students. On the other hand, distance education students in Accra were 1.402 more likely to improve their learning outcomes than those who have their study centre at Koforidua. Table 4.9 presents the post estimation test results for examining the goodness of fit of the model used in the logistic regression analysis.

Table 4.9: Evaluation of the logistic regression model fit (Goodness of fit)

	χ^2 ¹	df	Sig.
The overall percentage of correctly classified cases (%)	76.6		
Test for Likelihood Ratio	368.992		
Omnibus Tests of Model Coefficients	17.128	4	.002
The goodness of fit (Hosmer and Lemeshow Test)	1.860	5	.868
Cox & Snell R Square	= .047		
Nagelkerke R Square	= .071		

Source: Field Data (2019)

In testing the model fit (goodness of fit), Omnibus Tests of Model Coefficient (see Table 4.9) was used to carry out the test. It was expected that the test results will provide a higher significant level; $p < .05$ as suggested by Pallant (2007). Omnibus Tests of Model Coefficients provide the overall indication of how well the logistic regression model fits. The significant level (p -value $< .002$) is an indication that the set of variables (sex, age, study programme and study centre) considered as independent variables in the model better predict the dependent variable (learning improvement). The chi-square test supports the model's goodness of fit as indicated by Omnibus Tests of Model Coefficients. However, the significant level (p -value) is expected to be greater than $.05$ in order to confirm the logistic regression model's fit. In this case, the model best predicts (fits) learning improvement. This is so because the chi-square results ($\chi^2 = 1.860$; $df = 5$; p -value = $.868$) as

¹ Chi-square test for model coefficients

expected showed that the p-value is greater than the default 5 percent significant level. Although the Cox & Snell R Square and Nagelkerke R Square is considered as pseudo-R-square instead of the true R-square provided by multiple regression model results, they provide some level of information regarding the overall influence of the independent variables on the dependent variable in the logistic regression model.

As shown in Table 4.9, the R-square values indicate that between approximately 5 per cent and 7 per cent variation of learning improvement among the sampled distance education students is explained by their demographic characteristics such as sex, age, the programme of study, and learning centre. It implies that the hypothesis that students' demographics (sex, age, the programme of study, and learning centre) have no predictive power over learning improvement is rejected. Given that Age of the student is a statistical significant demographic characteristic in the logistic regression model, the null hypothesis of the unlikelihood that learning improvement of distance education students is related to any of their demographic characteristics is supported. Thus it is established that at least one of the demographic characteristics of distance education students is related to their learning improvement.

4.3.5 Pearson's Product Moment Correlation Analysis

Pearson Product Moment Correlation (r) was employed as part of the study's data analysis to examine the direction and strength of the relationship that exists among the critical variable of interest used in the study. The Pearson Product Moment Correlation (r) data output was generated from Stata SE version 13. The variables used in the analysis are defined as follows: SelfDir (self-directedness), Reflty (reflectivity), SkillDevR (learning improvement in skills development in research), SkillDevC (learning improvement in skills development in collaboration), FBTiming (feedback timing), FBMode (feedback mode), FBTarget (feedback target), FBQual (feedback

quality), FBQuant (feedback quantity), Sakai LMS (Sakai learning management system), OnlineSyl (embedded online syllabus), TotalLi (overall learning improvement), FBNature (feedback nature).



Table 4. 10: Evaluation of model fit (Goodness of fit) of Correlation Matrix for FB Strategies/Online Syllabus/Sakai LMS/FB Nature and Learning Improvement

		A	B	C	D	E	F	G	H	I	J	K	L	M
A	R	1.0												
	Sig													
B	R	.606**	1.0											
	Sig	0.000												
C	r	.538**	.623**	1.0										
	Sig	0.000	0.000											
D	r	.490**	.530**	.494**	1.0									
	Sig	0.000	0.000	0.000										
E	r	.534**	.480**	.470**	.487**	1.0								
	Sig	0.000	0.000	0.000	0.000									
F	r	.583**	.463**	.469**	.383**	.595**	1.0							
	Sig	0.000	0.000	0.000	0.000	0.000								
G	r	.514**	.424**	.453**	.351**	.541**	.609**	1.0						
	Sig	0.000	0.000	0.000	0.000	0.000	0.000							
H	r	.208**	.235**	.234**	.456**	.209**	0.098	.165**	1.0					
	Sig	0.000	0.000	0.000	0.000	0.000	0.066	0.002						
I	r	.376**	.429**	.438**	.458**	.515**	.424**	.436**	.212**	1.0				
	Sig	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
J	r	.462**	.504**	.506**	.438**	.508**	.534**	.541**	.186**	.580**	1.0			
	Sig	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
K	r	.462**	.504**	.506**	.438**	.508**	.534**	.541**	.186**	.580**	1.000**	1.0		
	Sig	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
L	r	.615**	.819**	.939**	.584**	.505**	.493**	.470**	.277**	.481**	.548**	.548**	1.0	
	Sig	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
M	r	0.093	0.085	.125*	.107*	.126*	0.094	0.085	0.048	.244**	0.097	0.096	.129*	1.0
	Sig	0.081	0.111	0.019	0.043	0.018	0.075	0.109	0.371	0.000	0.069	0.072	0.015	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed); SelfDir (A), Reflty (B), SkillDevtR (C), SkillDevtC (D), FBTiming (E), FBMode (F), FBTarget (G), FBQual (H), FBQuant (I), Sakai LMS (J), CourseSyl (K), TotalLi (L), FBNature (M)

Source: Field Data (2019)

The data results (Table 4.10) depict that with 355 observations, the correlation coefficient of feedback timing and overall learning improvement is 0.505. This portrays a moderate positive significant association between feedback timing and overall learning improvement at one percent significance level ($n = 355$; $r = .505$; $P < .05$). The result implies that as feedback timing increases, learning improvement will also increase and vice versa. The results further show positive statistically significant, but weak association between feedback mode and learning improvement at one per cent significant level ($n = 355$; $r = .493$; $P < .05$). The null hypothesis which claims no significant association between feedback strategies and learning improvement is rejected because

all the feedback strategies (timing, mode, target, quality and quantity) have a statistically significant positive association with the overall learning improvement.

More so, the correlation results indicate Sakai LMS ($n = 355$; $r = .548$; $P < .05$), course syllabus ($n = 355$; $r = .548$; $P < .05$) and feedback nature ($n = 355$; $r = .129$; $P < .05$) showed statistically significant association with the overall learning improvement. In terms of specific learning improvement, the data results depict that online syllabus, Sakai LMS and all the feedback strategies had statistically significant (p -values < 0.05) association with of self-directedness, reflectivity, skills development in research and skill development in collaboration. On the other hand, the nature of feedback showed a significant association with learning improvement in skills development in research and skill development in collaboration. Nevertheless, the nature of feedback's relationship with learning improvement in self-directedness and reflectivity was found to be non-significant (p -value < 0.05). It is evident in Table 4.10 that apart from the overall learning improvement (TotalLi) which had a powerful correlation with some of its components such as reflectivity ($r = .819$) and skills development in collaboration ($r = .939$), the rest of the remaining variables had weak correlation among themselves. These warranted further analysis using standard multiple regression because weak correlation among variables of interest is an indication that such variables would not violate the assumption of multicollinearity underlining the use of multiple linear regression.

4.3.6 Objective four: Effects of feedback strategies on learning improvement

4.3.7 Regression Analysis

This section is devoted to the regression analysis aimed at examining the magnitude of change in students' learning improvement (dependent variable) as a result of unit variations in some

independent variables of interest used in the study’s analysis. In order to obtain reliable results devoid of the presence of heteroscedasticity and the influence of outliers that have the potential of affecting the regression parameters in the linear multiple regression models employed in the study, a robust command in Stata SE version 15 was employed as suggested by Faraway (2004) and Fornalski (2015). This regression was employed to test the hypothesis that feedback strategies have no significant effect on learning improvement.

Table 4.11 Regression results on Feedback strategies, embedded course syllabus and learning improvement

Variables	Coefficients	Standard errors
Feedback Timing	0.811***	(0.312)
Feedback Mode	0.851***	(0.313)
Feedback Target	0.443	(0.291)
Feedback Quality	0.501***	(0.146)
Feedback Quantity	0.479**	(0.191)
Embedded Course Syllabus	0.444***	(0.103)
Constant	13.062	(5.427)
Observations	355	
R-squared	0.426	
Adjusted R-squared	0.417	
Prob > F	0.000***	

Source: Authors computation using Stata 15
 Dependent variable: Total learning improvement (TotalLi)
 Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The linear regression model shows total learning improvement dependent on feedback timing, feedback mode, feedback target, feedback quality, feedback quantity, embedded course syllabus and other factors captured in the constant term. From the regression results in Table 4.11,

Feedback timing has a positive relationship with total learning improvement. All other variables held constant, a unit change in feedback timing may result in 0.811 unit change in incremental learning improvement. The p-value of Feedback timing is statistically significant at the 5 per cent significance level. Thus, Feedback timing has a statistically significant effect on the level of total learning improvement. This implies that distance education students learning on the Sakai LMS may improve when they received timely feedback.

Feedback mode has a positive relationship with total learning improvement. Holding all other variables constant, the coefficient of feedback mode shows that a unit change in feedback mode may result in 0.851 unit change in total learning improvement. The p-value of Feedback mode shows a statistically significant effect at the 5 per cent significance level. This implies that Feedback mode significantly influences the level of total learning improvement.

Feedback quality positively influences total learning improvement. The coefficient of feedback quality shows total learning improvement develops by 0.501 units as a result of a unit change in Feedback quality, holding all other variables constant. The p-value of Feedback quality shows a statistically significant effect on total learning improvement at the 5 per cent significance level. Thus, the quality of feedback distance education students receive on the Sakai LMS may have a significant influence on their total learning improvement.

Feedback quantity is also positively related to total learning improvement. A unit change in feedback quantity may result in 0.479 change in total learning improvement, holding all other variables constant. The p-value of feedback quantity also shows a statistically significant effect on total learning improvement at the 5 per cent significance level. This implies the volume or quantity of feedback that distance education students derive from the Sakai LMS may significantly

influence how they improve in learning.

The embedded course syllabus has a positively significant influence on total learning improvement of distance education students. Holding all variables constant, a unit change in the embedded course syllabus may result in 0.444 unit change in the level of total learning improvement. This implies that when the course syllabus show how feedback will be used in the online learning context, learning improvement of online distance learners may improve.

The R-squared shows the proportion of variation in total learning improvement explained by the regressors in the regression model. The result shows that approximately 43 per cent of the variations in total learning improvement is explained by feedback timing, feedback mode, feedback target, feedback quality, feedback quantity and embedded course syllabus. All the regressors in the model except feedback target are statistically significant; hence the adjusted r-squared is approximately 43 per cent. The p-value of F-statistics (0.000) shows all the regressors are jointly statistically significant at the 5 per cent significance level.

Per the regression results, we fail to accept the null hypothesis that feedback strategies and embedded course syllabus do not have a significant effect on the level of learning improvement.

Table 4.12: Test for Multi-collinearity

Variable	VIF	1/VIF
Feedback Mode	1.91	0.522533
Feedback Timing	1.89	0.529757
Feedback Target	1.78	0.562271
Feedback Quantity	1.46	0.684516
Feedback Quality	1.07	0.934463
<i>Mean VIF</i>	<i>1.62</i>	

Source: Author's computation using Stata 15

The ordinary least squares regression model assumes no correlation between the independent variables in the regression model. Test for multicollinearity determines whether the independent variables employed in the regression model are highly correlated or not. Using the Variance Inflation Factor (VIF) to test for the presence of multicollinearity in the regression model, the decision rule is given as, 'If the VIF exceed 5, then there is the presence of severe multicollinearity.

A VIF of 1 shows no presence of multicollinearity and a VIF exceeding one and below 5 is an indication of moderate multicollinearity. From Table 4.9, Since the VIF is less than 5, we establish the absence of severe multicollinearity in the regression model.

The p-value of chi-square in the Breusch-Pagan test for heteroscedasticity is 0.1535, which exceeds the critical value of 0.05. Thus, the null hypothesis of constant variance or homoscedasticity is accepted.

Table 4. 11: Summary of hypotheses results

Hypotheses Path	Hypotheses	t-values	Beta	P-values	Decisions
FBTiming → FNLI	HA1	2.604	0.146	0.010**	Supported
FBMode → FNLI	HA2	2.723	0.156	0.007**	Supported
FBTarget → FNLI	HA3	1.521	0.084	0.129	Rejected
FBQual → FNLI	HA4	3.440	0.145	0.001**	Supported
FBQuant → FNLI	HA5	2.510	0.133	0.013**	Supported
EMS → FNLI	HA6	4.304	0.241	0.000***	Supported

*Note: *** $P < 0.001$, ** $P < 0.01$, and * $P < 0.05$*

Table 4.13 provides a summary of the hypotheses path of the study. The findings revealed that timing has a significant positive effect on FNLI ($\beta = 0.146, p < 0.05$) supported HA1, the mode has a significant positive effect on FNLI ($\beta = 0.156, p < 0.05$) supported HA2. Further the target shows an non-significant positive effect on FNLI ($\beta = 0.084, p > 0.05$) accepted HA3; quality

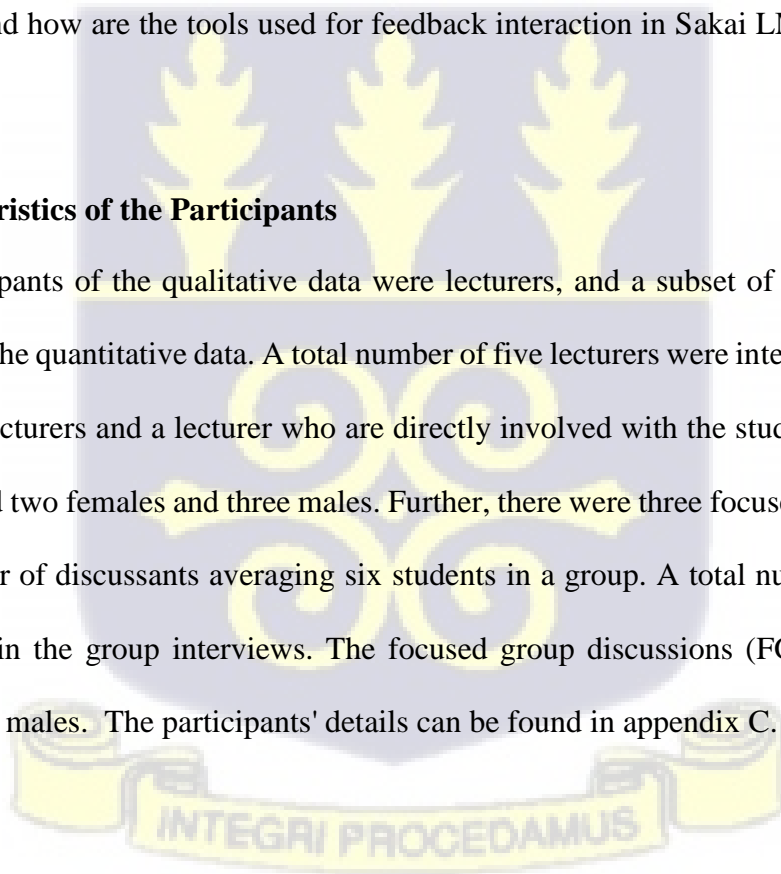
feedback had a significant positive effect on FNLI ($\beta = 0.145, p < 0.05$) supported HA4. Quantity feedback has a significant positive effect on FNLI ($\beta = 0.133, p < 0.05$) confirmed HA5. Finally, embedded course syllabus (EMS) also shows a significant positive effect on FNLI ($\beta = 0.241, p < 0.05$) confirmed HA6.

4.4 Second Phase: Analysis of Qualitative Results

The research sought to understand the phenomenon of feedback as it is used in the distance learning programme at the University of Ghana. This part of the study sought to explore the feedback experiences of both distance students and their lecturers. Given this, four research questions guided the analysis. These include, how do students and lecturers understand feedback, what is the nature of feedback, what are benefits or issues that students and lecturers have to contend with as they use feedback and how are the tools used for feedback interaction in Sakai LMS blended learning environment.

4.4.1 Characteristics of the Participants

The key participants of the qualitative data were lecturers, and a subset of the sampled student respondents of the quantitative data. A total number of five lecturers were interviewed. There were four assistant lecturers and a lecturer who are directly involved with the students on Sakai LMS. They comprised two females and three males. Further, there were three focused group discussions with the number of discussants averaging six students in a group. A total number of 18 students were involved in the group interviews. The focused group discussions (FGDs) involved eight females and ten males. The participants' details can be found in appendix C.



4.4.2 Thematic analysis

Thematic analysis was adopted as it allowed the researcher to organise the data set into recognisable patterns for the report writing. The reason for using thematic analysis was to understand the subject thoroughly. This allowed the researcher to look out for patterns of behaviours and practices. Some of the themes derived from the research questions are understanding feedback, nature of feedback, the usefulness of feedback, challenges and tools that enable feedback interaction. The themes were categorised into sub-themes and discussed. The thematic analysis provides full accounts of the experiences of participants as well as produces a trustworthy report (Braun & Clarke, 2012).

The six steps of Braun and Clarke's (2012) process of analysing thematically was adopted. Firstly, the data was transcribed then read and re-read in order to get familiar with the data. Secondly, initial codes were generated based on the exciting characteristics of the data. Thirdly, the codes were collated into themes and subthemes after which the coded statements were coloured to allow for easy reference. Fourthly, the data was re-read to tease out further aspects of the generated themes. Then the information of all the themes and subthemes were placed under the name of each participant. Fifthly, themes were defined and names assigned (Pretorius & Morgan, 2011). Sixthly, the report was then written. After obtaining all the themes, the narratives supporting each theme were extracted to illustrate participants' accounts. Finally, literature was used to compare the described themes. The table of themes and sub-themes is presented below.



TABLE OF THEMES AND SUB-THEMES

THEMES	SUB-THEMES
Understanding of Feedback	Insight input/output process Evaluation/Assessment/ Appraisal
Nature of Feedback	Directive/Directional Suggestive feedback Feedback target Feedback form
Benefits/Usefulness	Feedback improves learning Motivating Feedback Goad Direction
Challenges	Work overload Untimely feedback Lack of Resources
Tools	Assignment, Tests and Quizzes Polls Chatroom Forum

Source: Field Data (2019)

The lecturers were coded LR, and the students coded ST. The next sections elucidate the five themes and with their respective sub-themes that emerged from the analysis.

4.4.3 Understanding of feedback

The first theme emerged from the analysis is understanding feedback. The lecturers and the students said that an understanding of feedback is essential because it is key to the teaching and learning process. From the interviews, the lecturers intimated that lack of understanding of feedback in learning is the result of feedback illiteracy which implies that not knowing how to provide or to use feedback. The lecturers and students were asked to share their understanding of

the term feedback in learning. The sub-themes that emerged are insight, input-output process and evaluation of performance. These are elucidated below.

4.4.4 Feedback as Insight

Some of the lecturers said that feedback is about giving students the needed insight. They referred to insight theme as comprehension or understanding of something. That is to say, explaining ideas, concepts or issues emanating from the course content and activities students have embarked upon. Feedback as insight also means providing information to students about their exercises and assignments. A male lecturer explained that:

You are giving them an insight into their assignment so that they can also read and add it up into their learning. (LR 2)

Feedback is communicating an answer or giving me insight into the work I have done. (ST 2)

These quotations imply that feedback encourages understanding of what is required of students so that they can improve their learning. For the students, feedback concerns becoming aware of the expectation of so far as their assignments and exercises are concerned. Thus, lecturers and students understand that feedback in learning helps the sharing of information that gives insight into the course content as well as improve teaching and learning.

4.4.5 Feedback as an input/output process theme

The analysis further revealed that feedback could be understood as a post response activity (input-output theme) where students receive information on the assignments or in the Forum to correct their mistakes. A male lecturer who teaches Political Science explained that:

Feedback in learning to my understanding is giving students the needed understanding of their inputs. They have an input, you have given them an assignment and had input so, what is the input telling them, how do they get to understand these things, this assignment that I did, this information that I provided is on the right path or not. (LR 1)

The above participant views feedback as a post response activity on the tasks and exercises that students present for grading, which is their input, and the output may be their scores. Likewise, a female participant from the Nursing programme who uses Sakai LMS to interact a lot with the students had this to say about her understanding of feedback in learning.

Feedback is an input-output exchange. In my own way, I define feedback by what I do. I give the assignment to students, and they send me the assignment. I let them know why I am sending them the assignment, what I want from them. They do it, I give them information about what they have done well and what they have done wrongly, and that is feedback. (LR 5)

The above narrative suggests an input-output process. In other words, this Lecturer does not only give feedback at the end of an exercise. Instead, she provides feedback as and when the student needs it. Feedback to her is informative, corrective, and suggestive. Her understanding is that feedback can be used to improve students' learning when it is comprehended as an exchange between learners and their instructors.

From the students' perspective, a male participant stated that:

Feedback is like an input-output thing. So, feedback is what you get at the end of the day after submitting an opinion or doing a particular assignment or a required task. What you get at the end of it is the feedback. (ST 8)

The student's quotation implies that when they submit an opinion or assignment from a given task, is the input and output is the response they receive from their lecturers. Consequently, the provision of feedback from lecturers can improve learning interaction as well as enhance student self-regulation and self-directedness. Thus, both lecturers and students understand feedback in learning as an input-output process.

4.4.5 Feedback as evaluation

The analysis revealed that evaluative feedback theme is where students do an exercise and receive a grade or comment on the task they have produced. From the students' perspective, feedback in learning is like an assessment, appraisal or evaluation. Feedback is like an appraisal or evaluation of performance that someone gives to you according to a CSIT student participant.

This response resonated with most of the participants. A female participant from the BA programme puts it as follows:

It is the result of what you have worked for; the outcome is an evaluation of performance or an appraisal that someone gives to you ... so, when someone like your Lecturer gives you a rating, or any information or response because of your performance, then I think that is feedback. (ST 6)

The narrative reveals that feedback is the evaluation of the work that the student has submitted for assessment. So, the response that is received is feedback. These responses are indications that students and their lecturers have a fair understanding of what feedback is. Mostly they comprehend feedback as a way of assessing performance in the online learning context. It appears that more summative feedback is used than formative feedback. Again, it is assumed from the narratives that feedback is one-way.

4.4.6 Nature of Feedback

The second major theme was the nature of feedback. The nature of feedback in learning is relevant as it can aid lecturers to identify mistakes that students make so that they can help them accordingly. The sub-themes that emerged from the data were directive or directional feedback, suggestive feedback, feedback target and written feedback.

4.4.7 Directive or Directional Feedback

Directive or directional feedback theme is corrective feedback in nature. Directive feedback is about telling the student how to do the task. Feedback is transmission-based feedback or one-way feedback lacking exchange of information, ideas or opinion. Directive or directional feedback is about transmitting students' grades or scores to them after they have undertaken an assignment. The responses from the lecturers revealed that most of the time, feedback is directional. For instance, a participant stated that:

We usually mark the assignment and give the feedback concurrently, once they have the grade, it comes along with the feedback (LR 1).

Another lecturer said:

If it is a quiz I have set covering several sessions and I examine them, and it is over 30, and you get 20 or 22, I can display them such that you will see all the wrong ones and their alternatives. So, the student will see the scores. (LR, 3).

In these narratives, the feedback is the grades or the scores that students receive after they do an exercise or take an exam. Directional feedback is also in the form of praise because they deal with large numbers. For instance, a female Business Administration lecturer indicated as follows:

Sometimes too you will say oh well done, that is a good point, this means that the person is doing very well, oh so a good job was done that is good. So those

who are getting that usually will receive well done, more room for improvement, good work done (LR 2).

What constitutes feedback from the above account is the praise given, but no comment is given on the content that is being discussed, which is transmission-based feedback. These types of feedback may not necessarily lead to self-directedness, self-regulation or learning improvement. Most of the student participants confirmed what the lecturers said. A male student participant had this to say:

but the score is the primary type of feedback we all generally get in academia (ST 12)

From the above indications, the feedback was mostly to inform students about their grades or praise them for participating in the online or synchronous learning. However, there were some exceptions as the following sections revealed.

4.4.8 Suggestive Feedback

The second subtheme in terms of the nature of feedback is suggestive feedback. Suggestive feedback directs the student to explore ideas further. It is the ability to recommend ways in which students can explore and expand their ideas based on the information they have gathered from the content. Some of the lecturers gave comments that suggested how the students should do the task next time. A response from a female lecturer revealed that:

Feedback starts with sending topics for revision. So when they send a topic, and it is relevant I give them feedback about what is good about it, what is not right about it and I ask them to correct the topic. I send it back to them and expect them to re-submit ... if it is project work and you are doing progressive work, then I track the comments using the word review option suggesting what they should do and then I send you the tracked work for you to look on and do the correction. However, if it is just an assignment or a case study, you give me the

document for me to score you. Remember the kind of learning they are doing the emphasis is on scores (LR 5).

The above narrative revealed that when the Lecturer tells the student what is good about their submissions and what it is not in order for them to do the corrections and re-submit the assignment. Also, she uses the tracking icons in Microsoft Word to send her suggestions to the students. The above description shows that some of the lecturers are doing their best to provide suggestive feedback on students' task production that is, before and after, but more one-way feedback is practised. This is evident from the above quotations that those feedback comments were just guides for the students to correct their mistakes for a better score unless it is a project. This revelation may be due to the emphasis on score-based performance.

The FGDs confirmed that they do receive suggestive feedback. For instance, a female Sociology student stated that:

They let you know if you did not answer it well or you answered it correctly. With Sociology, they let you know how to answer that question and what not to do next time with answering such a question. They suggest to you how you should go about the work. Then with the Summative, it is just about the grades and that is it. However, I have more Formative than Summative. (ST 4)

The above response implies that feedback is suggestive rather than two-way or dialogic from the perspective of the students. Similarly, another participant intimated that

I have experienced formative feedback only once, in Political Science. After marking, the Lecturer wrote the places where I went wrong and those places he was impressed with. Nevertheless, it is usually summative. The comments addressed how I should have done the work in order to improve the assignment. (ST 9)

Again, the analysis shows that though feedback comments are mostly in the form of praise, some of the lecturers adopted suggestive methods in giving comments that students could use to set their learning goals.

4.4.8 Feedback Target

The third sub-theme under nature of feedback is the target of feedback. The interviews revealed that feedback targets the individual (personalised) student or a group of students. Three lecturers from different departments described feedback target. Thus, an assistant lecturer who teaches Computer Science and IT (CSIT) course described feedback target as meant for an individual (personalised) or meant for a group:

If the work is based on groups, then the target is a group, but if individuals then it is given to individuals; I allow them the grade themselves too. (LR 4)

In a similar vein, a lecturer in Bachelor of Arts (BA) programme during the interview described how he targets individuals or groups of students.

But usually, I will look at the trend of how they answered a particular question and based on that I will come out with the most frequent or widespread feedback that I had concerning the work and conclude and tell the group that this assignment needed you to do this and that and I give the group that general feedback in addition to their individual feedback (LR 1)

These two accounts illustrate that feedback targets both individuals and groups of students. A CSIT assistant lecturer (male), during the interview, also contributed to the issue of how feedback is given by chronicling the process by which their department targets the students in giving out feedback.

So, we break them into groups, usually when the class sizes are large, and you also break them into groups when you have a project, and you want it to be done in a group. So that you better be able to allow them to interact and the tools on it also allow them to be able to communicate among themselves privately. So any feedback is referred to the group. (LR 3)

These views on feedback target shared by the sampled lecturers who teach their respective courses confirmed the students' acknowledgement that although both personalised and group-targeted feedback exists, their utilisation was found to be low. The narratives also reveal the reasons why feedback targets group, which is to allow students to interact and learn from each other.

Further, the analysis indicated that once the target is the group, students got the opportunity to receive group feedback. A male CSIT lecturer said that “comments are generally to the class but not specific individuals” (LR 4). The Lecturers also said that they created groups in which students learn together or collaborated, and the feedback is targeted at the group. Some of the responses are presented below.

There are situations where you want to give individual feedback, but most of the time I want to give group assignments so that they can meet and discuss, and this helps them a lot. It helps them because students have different learning abilities and so when they meet like that when somebody does not understand, but another person does, they can discuss. (LR 3)

This participant also gives more group feedback. Even though group feedback might help students to learn better and co-create knowledge, the analysis also indicated that students have different learning abilities. Therefore, lecturers need to give both individual and group feedback as much as possible in order for them to take advantage of their learning abilities. Another lecturer who targets both individual and group feedback had this to say.

If the work is based on groups, then the target is a group, but if individuals, then it is given to individuals. I have also said that in my type of assignments, I allow them the grade themselves. So I upload the marking scheme and what they should look out for. So, after you have submitted your assignment, then you can now see

the marking scheme, then you can use the marking scheme and grade your peers. And then when you grade that person, it shows that you have graded somebody then I will grade your work. I have used it twice, but the students had issues using it. They were not willing to grade their peers even though I had taught them on the Telegram page how they should grade their peers and their responsibilities (LR 5).

The above story implies that this participant targets both group and individual feedback. However, she the reason why she targets the group is to allow the students to peer assess themselves by providing the students with a rubric as a guide.

Even though this is good because such an exercise could develop critical analytical thinking and independent thought skills in students, the problem is, are peers commenting on their colleagues' work or just scoring them? Also, the students failed to take advantage of the opportunity to conduct peer assessment though it could lead to student autonomy. Maybe they want to look good in the eyes of their peers, not wanting to offend them.

On the contrary, some of the student participants had better peer feedback experiences in other courses. They indicated that peer feedback led to deeper learning. A male BA student shared his experience as follows:

In my case that happened in Level 200 UGRC Academic Writing. There was a Forum, and we had peers commenting where a topic was given, such as what is a sentence. So, per your elaboration on what a sentence is, another student will come and comment on it, and I learnt a lot from my peers. So we received group feedback, but it helped us in peer assessment (ST 7).

The feedback that targeted groups, therefore, helped online students to learn together as it enabled them the opportunity to interact with and learn from each other.

4.4.9 Feedback Form

The next subtheme on nature of feedback was the form of feedback, whether it was written, oral or electronic. The analysis shows that most of the feedback was written, either given as comments or scores or oral. A female lecturer indicated as follows:

There is a column on Sakai called remarks, usually, when I start the marking, I can add the remarks (comments), but when it gets to a particular stage, I am unable to do that because it slows the work down ... However, it is usually something small to show that you have read. (LR 2)

The above narrative indicates that the form of feedback is written comments, but it is not elaborate, and the reason is that writing comments slow down the marking process.

In a different vein, a lecturer revealed that he gives oral feedback. When he was asked to explain, he narrated the following.

If it is a discussion (Forum) and they ask a question on a concept for example, then I try to explain (in the Chatroom) for them to know whether they understood, I give them another example to solve. If they can do it, then I give them oral feedback. (LR 3)

The above account implies that, even though oral feedback is instant, it still targets the group more than the individual. Also, until recently, when lecturers mandatorily had to use virtual classrooms because of COVID-19, the electronic feedback was few. Only the Nursing lecturer used audio feedback in Telegram with her students. She intimated that "I was using Telegram to give the assignments and use it to share the videos, use my voice to leave them feedback". Likewise, the narrative shows that the form of feedback used in the online distance learning programme is written more than oral or electronic.

4.4.10 Benefits and usefulness of Feedback

Benefits and usefulness of feedback is the third major theme that emerged from the data. The analysis indicates that effective feedback is beneficial and useful to learners and lecturers. The sub-themes that emerged are feedback that improves or enhances learning, feedback motivates and goal-directed feedback.

4.4.11 Feedback that improves learning

This sub-theme showed that learning improves when feedback is effectively provided. The students said:

The comments addressed how I should have done the work in order to improve the assignment (ST 7)

It tells you that this is how far you have performed and so for me I took it upon myself to improve (ST 13)

All the participating lecturers affirmed that providing feedback helps students to improve learning and to perform well academically. For instance, a female lecturer had this to say:

It (feedback) helps students to learn, and it improves learning, it enhances critical thinking, it gives direction, it allows questioning. (LR5).

More so, the analysis indicated that critical thinking, giving direction, and questioning are vital aspects of learning, and useful feedback brings out these attributes for teaching and learning. Thus, when students are given the necessary feedback in the online learning environment, it will enhance their learning. They will become self-regulated and self-directed, therefore, learning improvement. Still, on learning improvement, the analysis revealed that feedback develops skills in the learner.

A lecturer explained that:

Through the groups that you put the students into, through specific projects, they learn from each other, they learn how to collaborate and also build interpersonal skills to be able to relate to each other. (LR 4)

In other words, the collaboration between students and their peers creates a team spirit. It sharpens their abilities, such as self-confidence in the manner in which they may present their ideas. Moreover, learning improvement leads to the discovery of knowledge. A female lecturer said:

The teacher herself will learn through feedback because you could give feedback to a student and a student will draw your attention that, I was reading this and I found that, but your comments are saying this, could we have a second look at what you are saying ... So feedback is not one way. (LR 5)

The above statement suggests that both the Lecturer and the student can exchange important information regarding the new knowledge, thereby enhancing teaching and learning. The feedback that enables learning also creates a dialogue between the teacher and the learner. It is reciprocal where the Lecturer and the learner benefit from the process. Other participants explained that learning improvement through the use of feedback is critical to online learning. The following quotation resonated with most of them.

It is critical, especially online. We cannot do without feedback [serious faced]. If you want to impart, let us look at the human aspect of it, you want to make sure that the students have understood the content that you are delivering, that they are ok with it, they are ready they are prepared for the content. (LR 3)

In our virtual electronic learning context, what happens is that it affords you (Lecturer) the chance to be able to be in constant communication with them (students) in order to help them enhance their learning and academic performance. So this is one advantage of Sakai learning in the DE. (LR 4)

These participants have revealed that feedback is indispensable in online learning and that it enhances understanding of the content being delivered to learners so that they can perform well. Also, feedback enables a constant interaction between lecturers and students and between students and peers in the online environment. Useful feedback thus reduces the transactional distance between lecturers and students while improving teaching and learning because it creates dialogues between the users. A male lecturer from CSIT intimated that:

Feedback also creates nearness (even though virtual world) between you and the student, so it is as though you are in the four corners of a physical classroom with you so that they do not feel the absence of the Lecturer too much. They see you, hear from you, see you typing. This visibility creates confidence in students to questions concerning topics being treated. (LR 3)

Similarly, "they would not feel left out, they would not feel distant, even though it is distant education." (LR 4)

These quotations imply that at least sometimes students can see their lecturers and peers, especially when using the Meeting tool in Sakai. Again, as they can see their lecturers, they gain the confidence to ask questions relevant to the content. In other words, relatedness with each other is enhanced, which will invariably lead to learning improvement.

4.4.12 Motivating Feedback

Feedback motivation is another sub-theme under feedback benefits. Feedback motivation is what compels students to exert effort in learning. Some lecturers revealed how feedback motivates their students. The following quotations echoed their responses.

He (student) is motivated both intrinsically and extrinsically even though you (Lecturer) are not seeing him and giving him a pat on the back. However, He is

motivated, just knowing that he is making progress, am capable of making it. Useful feedback will significantly ensure learning autonomy. (LR3)

There is one student who has always been reminding me that I gave the assignment then I gave him a comment that he will be a good diplomat because of the way he had produced the work. So he is a diplomat in the making, and it is something that is always motivating him; that oh sir because of this information that I presented and then the feedback that you gave me I am always motivated. (LR 1)

It can be deduced from the above accounts that feedback motivates online learners to be focused. It also means that user feedback leads to learner autonomy and learning achievement. Furthermore, feedback extrinsically motivates learners to self-direct their goals towards more extraordinary life achievement. The female Nursing Lecturer added that "effective feedback builds consistency in learners". In other words, feedback creates the right attitude towards consistent learning in the online student. She further explained that:

The whole idea of feedback, whether negative or positive, is to enhance or build the learner. In other words, constructive feedback builds, motivates, and there is a way you give negative feedback, and it breaks. (LR 5)

Thus, in order to motivate the learner, the feedback has to be constructive and not harmful. For example, the same participant intimated about constructive feedback that motivates as follows;

Oh, this is a reasonable effort, I had seen that you had mentioned this and that, but when you mentioned it, you failed to link the difference between this and that, but that is what the focus of the work is. Can you take a second look at this part that is not so strong building on the points that you have given? (LR 5)

This analysis implies that when the feedback is demeaning, it demoralises or demotivates the learner. So the Lecturer's attitude in giving feedback is also critical in motivating the learners positively. Thus, using respectful language in giving feedback is critical, as indicated by the statement below.

The nature of the feedback is encouraging words because these are students that generally, the majority are students who get lower grades so you cannot compare them to the regular students ... So, when as a facilitator you are helping them, and then you give them harsh comments, it kills their morale, and it usually affects them psychologically ... the nature of the feedback is supposed to encourage them rather than to discourage or demotivate them (LR 1).

4.4.13 Goal Direction

The final subtheme regarding benefits of feedback is goal direction. The FGDs revealed that whether the feedback is from lecturers or their peers, it helped the students to organise their learning goals and to self-direct. The following are some of their responses.

Lecturer's feedback is beneficial because it helps you to learn more. For me, it also encourages me to speed up because at the end of the day I realise that what I am doing is not enough, (ST 1) ... "Yeah, peer feedback is beneficial because at the end of the day we are all learning by bringing on board different opinions, so it makes learning easier." (ST 5) ... "So if I am not doing the right thing or I am not learning as I am supposed to, feedback from my peers encourages me to become focused. The opinions of my mates help me." (ST 10)

These responses indicate that feedback from lecturers and peers encourage goal direction and reflectivity. Also, feedback helps the students to speed up their learning. Moreover, a female student succinctly described how feedback directs her learning experience.

Feedback is vital to me, as well as everyone. That is what I think because if am doing something and am just doing it and I do not have any form of feedback, it is like I am just working, abstract, without knowing my direction. So you need feedback for direction so that you know whether what you are doing is right or wrong or where you need to fix things in their proper perspective. (BA P9)

This participant's feedback experience revealed that feedback is essential and beneficial in online learning and that the lack of feedback may lead to misdirection of learning goals and therefore, low academic performance. Feedback helps learners to remain focused and to find their way back to where they should be in terms of the pedagogical content. Still, on the issue of goal-directedness, students disclosed that feedback comments on their tasks helped them to adjust to the course or programme and to know how to progress. A male participant said that:

Feedback is essential for me because we were admitted into the University and some of the courses we are taking are new to us, we have not done it before, even at higher levels. The lecturers are presumed to have known the course, so if there is no feedback, it makes learning difficult ... And so, feedback is vital especially from someone who has gone high and deep into the course and knows what is required for it, and that is what we need. (BA P8)

This participant is expressing confidence in the Lecturer's knowledge of the course and ability to deliver because this expert knowledge will help direct them to do the right things. However, he is worried about the absence of feedback. It implies that the absence of feedback will make learning difficult hence it will negatively affect learning improvement. Similarly, another student participant echoed that feedback allows them to know what the Lecturer wants. When asked to explain, this is what she had to say:

For me, feedback from the Lecturer is essential to me because it makes me know what the Lecturer wants. Maybe in the slides or modules, it is like this, but maybe he wants it

to be the other way. It is about what the Lecturer thinks is right. Some of them, it is not about what you think. It is about how they want you to think or answer the questions.

(BA P4)

In other words, the student is confident in the Lecturer's knowledge and expertise to guide her learning and to meet the demands of the course. Such feedback will enable her to reflect on the information that has been provided and use it for further research.

4.4.14 Challenges of giving and responding to feedback

The fourth theme had to do with challenges and constraints feedback provision in the blended learning context. Challenges hinder the practical usage of feedback in the pedagogical setting and setbacks for teaching and learning. The sub-themes that emerged regarding the challenge of feedback are work overload, untimely or delayed feedback and lack of resources.

4.4.15 Work Overload

The first sub-theme under challenges of feedback is work-overload. Overall, the use of feedback strategies (written and target feedback) was described by the lecturers as ineffective as a result of work overload. Large student numbers were judged to account for this finding leading to work overload and were disclosed by the lecturers who were interviewed. For example, a female lecturer had this to say:

The difficulty is the numbers, and because of the numbers I am unable to give adequate feedback ... then if you leave it to the principal lecturers, they will never get the time to go online. (LR 2)

Similarly, a male lecturer stated that:

And then for CSIT, we are only two assistant lecturers taking for example 21 courses from level 100 to 400. So I have ten courses, and each of them

is three credits. It is not possible to give feedback to all these students. So the fact is that we do not do all, for example, level 400, the interaction is low as well as level 300 (LR3, Male).

The experiences of these lecturers suggest that the lecturers are constrained with having to provide feedback to large numbers of students at a go. It also implies that synchronous feedback is impossible. Furthermore, it appears that the lecturers have too much workload in terms of the courses they handled. More lecturers are therefore needed in order to reduce the workload of these lecturers teaching in the distance learning programme and to ensure better feedback experiences in the online teaching and learning environment.

4.4.16 Untimely and delayed feedback

Untimely and delayed feedback is the second sub-theme of feedback challenges. During the analysis, some of the students were concerned about untimely and delayed feedback. For instance, two students indicated as follows:

Sometimes timing is the issue. Like we learn in information studies, feedback will be relevant at a certain point in time. Maybe I need feedback on a specific test or assignment I did, but I get it later then it becomes irrelevant. You do not know what to do with that feedback again. (ST 6)

Sometimes there has to be a means that you can get feedback, you see when we are doing the IA, you submit the work and sometimes you are graded. Sometimes you do not even know the questions you answered wrongly... So, I can get an indication of whether it is wrong or right. So that I can learn from my mistakes. This will make learning easier ... when you meet or see it again in the exams, and you might choose the same wrong answer again, not knowing whether it is wrong or right. (ST 2)

The participating students are concerned about delayed and untimely feedback. They are worried about how a lack of feedback impacts negatively on their learning and performance. When

feedback is late, it becomes irrelevant to online learners. These participants are also worried that they do not receive feedback during interim assessment or main examination. The fact that students are not given the needed feedback on their assessment makes them unhappy. They felt that they are losing out on learning objectives.

4.4.17 Lack of resources in Sakai LMS usage

Lack of resources was revealed as a sub-theme of the challenge to the use of Sakai LMS. Resources include materials, access to computer labs and the internet. Students indicated that sometimes the resources (learning materials) that they need for learning were not available on Sakai, especially for those in Economics and Psychology departments. When questioned, this is what one of the students had to say.

I had an experience with Public Finance (Economics), and the slides were posted at the resources section up to like session four instead of up to session 11 or 12. Nevertheless, after session 4, even when you open session 6, session four will display. So it is as if you have only session 1 to 4. So even when you want to learn past session 4, you cannot do so (ST 6).

One other thing is the accessibility of IT Labs. Sometimes you are somewhere you may not have your gadgets or devices with you, and you come here too they tell you that they have closed the Labs or they are doing something there, and you want to learn online, and this is the problem. So it makes learning online tedious and discouraging, you want to go online, but there is no opportunity for you. Sometimes you go into the labs, and they will tell you that they are working so everybody should go out. Moreover, the way they say it too is as if you are putting a burden on them. However, the lab is there for us to use. We need to use it, but when you go there, they will tell you that we are working. I mean you just cannot fathom how they manage the system. (ST 14)

I think technology is the backbone, talking about an LMS which is the Sakai is a product of technology and to be able to get access, which is the internet, you need

the devices, the speakers, the laptops. So all that you are saying the backbone is technology. However, sometimes they are not available ... Then there is the issue of the devices (technical). Nobody has given us laptops, so we come here and use our laptops. The internet, sometimes it is down. When you are in the house, nobody gives you any credit (data) to work with, except during interim assessment and examinations time they give us some small data. So these are some of the challenges. (LR 3)

The analysis clearly shows the kinds of frustrations that some of the students felt when they have to use the Sakai LMS.

4.4.18 Tools used in Sakai LMS

Tools emerged as one of the major themes in the study. The analysis revealed that most of the lecturers interviewed used the tools in the Sakai LMS to engage their students either to assess or to interact with them. The tools that are used for assessment include tests and quizzes, assignment and polls. Those tools used for an interaction are the Chatroom, Forum, announcements, lesson (few of the lecturers used this tool), meetings, emails. Then there are tools which are mainly for keeping learning materials such as resources and dropbox. These tools were classified into sub-themes. Besides, two sub-themes emerged with the use of social media applications. These are the WhatsApp and Telegram applications that helped interaction. These additional tools are not in the Sakai but are utilised by the lecturers and their students to learn and interact. The subthemes are described below.



4.4.19 Assignment/tests and quizzes tools

The first sub-theme for tools is assignment/tests and quizzes. As stated earlier, the assignment, tests and quizzes tools are used to assess the students' performance and to give them feedback to determine their progress. A male lecturer in the Bachelor of Arts programme had this to say,

For the assignment tool, we use it for every subsequent weekly assignment or in my class; for instance, I use it for term papers. So I give them a term paper at the beginning of the semester which they are supposed to submit before or after the IA... I usually give them six weeks to submit ... Then I mark it for them to see their scores. For the test and quizzes, they take many exercises, every week to assess their progress. (LR 1)

Another participant, a female from the Business Administration programme spoke of using the assignments/tests and quizzes

I also do the tests and quizzes, sometimes assignment tool (LR 2).

4.4.20 Polls Tool Usage for assessment

The second sub-theme under tools is polls. LR1 further explained that he uses the polls tool to assess students' opinion about current affairs related to topics in the course content. This is what he had to say:

For the Polls, maybe, let us say, I normally look at current issues, and out of that, I try to tease out their experience and then their knowledge regarding that particular current news or information per what they are studying. So, if I want to measure their opinions, about certain things that are happening, I use the polls such as in Political Science that I teach. For instance, Ghana beyond aid, is it feasible? So, do you think Ghana beyond aid is feasible, do you think it is achievable? So, put this on Polls and students will respond to it (LR 1)

These narratives illustrate that the lecturers are using the assessment tools in the Sakai LMS. For instance, LR1 uses the polls tool to test opinions and assertiveness of the students. Through the use of Polls, he generates further discussion on the topic with the students. Thus, through the assessment tools, these online learners' performances are assessed and graded. The responses further show that the lecturers used the assignment/tests and quizzes to schedule exercises for the students. The students, in turn, submit their assignments and take tests and quizzes via these tools. The following are their responses:

We use the Assignment tool for task submission and the Test and Quizzes tool to participate in Interim Assessments. (SR 1)

I usually go on Sakai basically to engage in tests and quizzes, and assignments that we have been notified about. (ST 9)

Some of the Tutors they have been giving us assignments at the assignment section, and we have been given IAs, tests and quizzes. (ST 10)

These responses confirm that a chunk of assessment is generally done as part of the online teaching and learning through the Sakai LMS.

4.4.21 Use of Chatroom

The Chatroom theme was the primary tool used for interactive discussions between lecturers and their students in the blended learning environment. The lecturers mostly used the Chatroom because it enabled the active participation of the students. When questioned, some of the lecturers explained as follows.

If I realise that some topics are difficult to get at the tutorial which is face-to-face, I do a Chatroom discussion, so we go to the Chatroom after we have sent an announcement to give them prior notice. Maybe you give them three days to

read from section one to three and that you will be discussing some particular topics so on this day come online ... I pose questions such as in your view, or as a management student what is your understanding of human behaviour in an organisation? Behaviour in the organisation can be linked to maybe a tripod. What does it mean? Behaviours that are seen are efficiently dealt with, behaviours that are unseen in the workplace are problematic, and those are the ones that usually bring organisations down, then we discuss. (LR 2)

They are also kept constant, kept interactive on the platform because we chat with them in the Chatroom on relevant topics discussed (LR4)

You can also use the Chatroom to get feedback from the students on anything. For example, the Chatroom is there any time, so anybody at all can go there any time. So, we let them leave their concerns there, and then you go there later and address it, but mostly we want to do that when you have set it for a longer time.

(LR 3)

The participants' responses indicate that the Chatroom is used for discussion and interaction between the lecturers and their students. Some of them ask them questions on topics discussed at tutorials which the students found to be difficult to understand while others use the Chatroom to give feedback on the content as well as to address learners' concerns. There are critical interactive tools in the Sakai LMS that can engender feedback interaction between and among students and their lecturers. It is also used as a medium to contact themselves. Thus, the Chatroom is the tool that is mostly used by the lecturers to engage and interact with the students in the blended learning environment. It also implies that those lecturers with high capacity to use the Sakai are passionate in utilising it successfully.

The focus group discussions threw light on some of the tools used in Sakai LMS. These viewpoints are expressed below:

We use the Chatroom for general discussions, whereby someone does not understand anything, anyone with an idea about the subject matter makes that contribution (share ideas), and we all learn. There may be pluses or minuses. We have discussions also on several topics such as in Information Studies (ST 6). After we were taken through Sakai training, some of us now used the Chatroom whenever anybody has questions, or maybe IA or the slides for the course and the one who knows the answer can respond to it or the Lecturer himself will come and answer it. And then they tell us how the examination will be like, whether it will be all essays or objectives. All this information is provided in the Chatroom. This is done for most of the Sociology courses but not for Psychology courses (ST 4).

The Chatroom is for interaction with lecturers, but for peers, we use WhatsApp to discuss and share information ... (ST 1) We also get some feedback from our peers in the Chatroom when the lecturers schedule a Chatroom discussion ... Anything that we do not understand he will explain to us. Furthermore, sometimes, he lectures from the Chatroom by typing. (ST 17)

The analysis revealed that students use interactive tools to learn about concepts and to share ideas. These views expressed by the sampled distance education students paint a good picture about the fact that the use of Sakai LMS has been embraced by most of the students and that intensifying the use of the system for relevant feedback and information sharing would enhance self-directedness and reflectivity. Nevertheless, Sociology students had better experiences with the use of Chatroom than Psychology students.

4.4.22 Use of Forum

The next subtheme in terms of interactive tools is the Forum. The lecturers said that Forum is used for discussion and interaction on pertinent topics and issues about the course outline that deserve

particular attention. The Forum is also used to allow students enough space to express themselves about these topics. Furthermore, the Forum is used to allow students to provide feedback to their peers. In this case, the Forum is set up in such a way that a student has to submit before one can see other students' submission. The lecturers shared some of their experiences with the forum tool.

I use the Forum tool a lot ... in the Forum you cannot see another person's submission unless you submit one. We usually tell them that when you participate in discussions in the Forum, you get the additional mark. So make sure that you comment and participate in the Forum. The Sakai tool has been designed in such a way that you have to submit before you can see other's submission in the Forum. They do make submissions because they want to help themselves. (LR 1)

From the above account, it appears that the Lecturer sets up the Forum discussion for peer reviews. In other words, a student can comment on other students' submissions only after they have submitted their opinions. This is an excellent way to use the Forum tool to interact and to collaborate in the Sakai LMS. It also implies that the lecturer moderates that discussion between the students to ensure that the right information is shared. The students will then use this information to guide their learning goals. Another lecturer had this to say:

Forums too, are used. I use Forum generally at the end of the semester as a way of trying to recap and elicit their opinion about everything that we have done. So, you can bring any topic of interest to the Forum. The idea is to make it exciting, so sometimes the students themselves bring in questions. I use the Forum from the idea of an open forum where I seek general responses from the topics that have been discussed (LR 3).

This participant uses the Forum tool as discussions fora. He does not use it to assign tasks for interaction as giving an assignment. Instead, Forum is the place where, at the end of the semester, he meets his students for an overview of the course outline. The interaction is between him and his

students. It can also be inferred from the narration that feedback is an exchange between the Lecturer and the students. An Administration lecturer had a different story to tell. She said that:

For a semester, I give three Forums ... When you put a Forum question there, it has an expiry date ... Thus, we encourage students to meet the deadline. Nevertheless, you set a Forum question, and the students send the answers to your email when they fail to meet the deadline. This is very frustrating, so I reported the issue to the coordinator ... Despite this setback, for the student to lecturer interaction and collaboration, the Forum is excellent. (LR 2)

The analysis indicates LR3 uses the Forum tool three times in the semester but is frustrated that the purpose of the Forum, that is, to interact with the students and between the students is not being achieved. The students missed the deadline because they are workers doing distance education. Nevertheless, she is of the view that the Forum tool is a needful tool for interaction and collaboration between students and their lecturers. Feedback then becomes useful when interaction and collaboration are possible in the Forum too. These participants agree that the Forum is therefore used to assign tasks and exercises as well as for discussing and reviewing the course syllabus.

Some of the student participants in the FGDs confirmed what the lecturers said, but some of them did not. When they were questioned about their experiences with the Forum, they said that:

In the Forum, the Lecturer divides the students into groups for topical session discussions. This is my experience in Sociology from level 100 to 400. (ST 4)

I go on Sakai to engage in Forums and Class discussions which I barely get to do on time because sometimes we do not follow the notifications, personally so I miss many class discussions if there are any. We are also not scored for the exercises in Forum (ST 9).

For Political science, we usually receive more assignments through the Sakai, but for Information, it usually comes in Forums and Quizzes, but it is more with Political Science. In the Forum, you post yours then you can read the work of others. (ST 5)

A little bit of the Forum and then in Level 300 it continued but not in level 400 (ST 11) ... The farthest we have got is Forum in Level 400. What do you do there? The Lecturer uploaded some questions, and then we answered them. The course was 425 Forensics. That Lecturer is very conversant with Sakai. Throughout our programme, he has been consistent. (SI 12)

For the BA participants, those in sociology said they used the Forum from level 100 to 400. The participants studying Political Science and Information Studies also said they used the Forum with their lecturers. However, the participants studying Economics and Psychology reported that they do not use any of the interactive Forum tools. Those in CSIT also said they used the Forum tool sparingly except for one particular Lecturer who consistently uses the Forum tool with the students. In comparison, the lecturers said that they used the Forum to assure interaction and collaboration with and among the students, most of the students told a different story.

The analysis revealed that only a few lecturers used the Forum tool to engage the students. These revelations show either a lack of commitment or lack of capacity to use the Forum tool.

It is noteworthy to mention at this point that some of the lecturers used WhatsApp and Telegram, which are social media applications to interact with the students. They used social media as a means of contacting the students to pass on information about courses and assignments. The participant who was using Telegram had this to say.

I had a Telegram App to support Sakai because the Sakai was more complicated for them. So I was using Telegram to give the assignments and use it to share the videos, use my voice. So we are on Telegram if they have any issues, and that one is just on the go, and they were more engaged in the space. **(LR 5)**

This result shows that the Lecturer could identify the needs of the distance students and took advantage of the social media application to interact with them. She even said that she used audio feedback to share information and to engage the students. This implies that if Sakai LMS is complex to use, other social media applications can be linked to Sakai for easy interaction with students since that is where most of the students can be found. It is worth noting that only LR5 used audio feedback with her students.

4.4.23 Chapter Summary

All in all, chapter four was devoted to the presentation and interpretation of the data used in the study. It concurrently explored the use of both quantitative and qualitative analytical techniques to assess the feedback strategies used in online learning and how it influences learning improvement using a particular LMS (Sakai) at the Department of Distance Education, University of Ghana. The analyses were done within the scope of the specific objectives the study sought to achieve.

However, part of the analyses focused on testing of some research hypotheses to confirm or invalidate different testable statements. The descriptive analysis employed includes frequencies and percentages alongside qualitative narratives based on results gathered from the open-ended questions in the focus group discussion and interviews. Other techniques considered in the analysis include Pearson's chi-square test for independence, multiple regression and factor analysis. The various thematic areas that were factored into the analysis include students' demographic characteristics (sex, age, programme and centre) of respondents and their relationship with other variables of interest. Other sections of the analysis focused on how Sakai LMS is used in DE, how

feedback in the course syllabus is described, and feedback strategies used in Sakai online for learning improvement work. A summary of the major qualitative themes was understanding of feedback, nature of feedback, benefits of feedback, challenges of feedback followed by tools used in Sakai LMS.



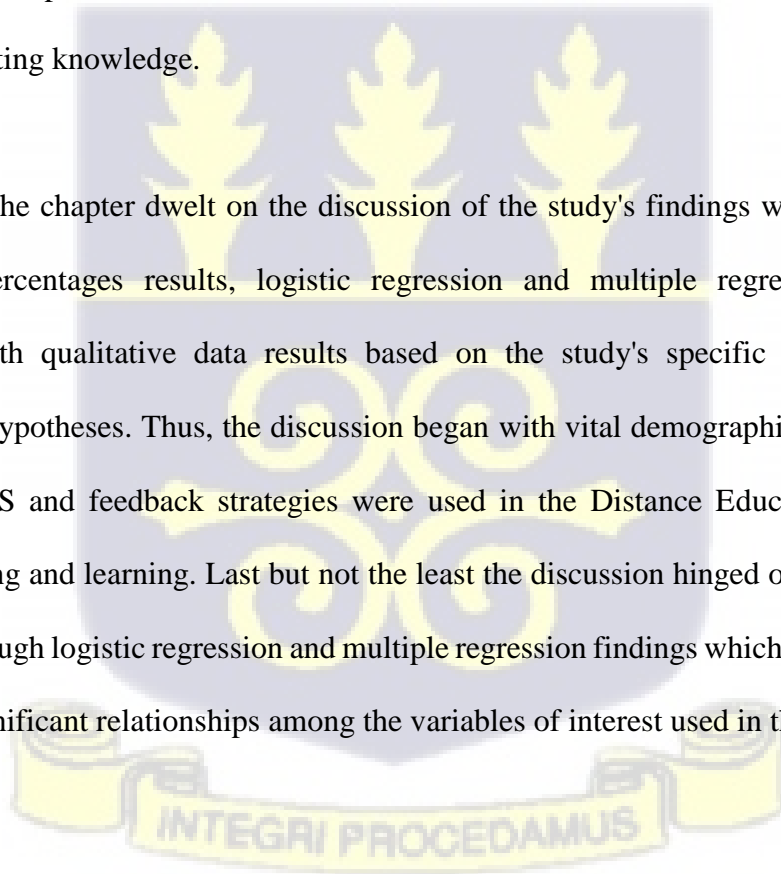
CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Introduction

Chapter four of the study focused on the presentation of the results for the study. Several findings emanated from the data results. In order to achieve the study's broad objective of the assessment of feedback strategies used and how they influence learning improvement using Sakai Learning Management System in the distance learning programme, this chapter is reserved for discussion of the study's findings. Based on the results presented, the chapter was set to convey the discussion of the study findings in order to establish empirical linkages and also to highlight the theoretical and practical implications of the findings. Aside from some limitations acknowledged in the discussion, the chapter further concentrated on the value-added and contribution of the study's findings to existing knowledge.

Consequently, the chapter dwelt on the discussion of the study's findings which emanated from frequencies, percentages results, logistic regression and multiple regression results being triangulated with qualitative data results based on the study's specific objectives, research questions and hypotheses. Thus, the discussion began with vital demographic characteristics and how Sakai LMS and feedback strategies were used in the Distance Education programme to improve teaching and learning. Last but not the least the discussion hinged on testing of research hypotheses through logistic regression and multiple regression findings which aimed at confirming the existing significant relationships among the variables of interest used in the study.



5.2 Demographic Characteristics of Respondents

The study found that some of the programmes were either male-dominated or female-dominated—for instance, BSc. Nursing programme had more females enrolled and that of BSc information Technology was dominated by males. This finding is consistent with the arguments of Bray (2007) that males quickly adapt to technology than females.

Furthermore, the percentage of Nursing female students was higher (20.3%) than in all the other programme categories. Research suggests that few males are found in the female-dominated nursing profession than in other professions (Barrett-Landau & Henle, 2014; Meadus, 2000). Other reasons that could be alluded to more women enrolling in the DE programme as they grow older are family and social roles. Research is in agreement that, women are the ones more likely to put their careers on hold and take it up again later due to family roles they have to undertake including childbirth (Boadi & Letsolo, 2004; Light, 2013). The finding further supports the assumption of Light (2013) that females within the context usually are challenged by work-life balance. Therefore, distance learning offers one of the opportunities for women to further their education. In this regard, distance learning education has provided a unique opportunity for people who are working and wants to further their education of which women are not excluded.

A high number, approximately (62%) of the distance students were employed. The high rate of employed respondents means that the students have to juggle between studies, work and family-related issues, making the choice of distance education relevant to them. This finding is consistent with that of Badu-Nyarko et al. (2017), who argued that many adults who work and have other roles to play could not enrol in regular higher education programmes. Furthermore, the study found that the majority (66%) of the respondents were young adults (17-27 years) with the remaining (34%) being older adults (28-50+ years). This finding corroborates other findings that distance learners are adults looking for information despite their ages might behave in different

ways whilst lacking the boldness to search out the right knowledge (Boadi & Letsolo, 2004). So in order to authenticate their learning, they need support such as feedback from lecturers and peers.

5.3 Students' perception of formative and interactive feedback used in online learning – Objective 1

Students' perception of what constitutes formative feedback (mean=3.51; SD=1.19) and interactive feedback (mean=3.03; SD=1.20) is critical in promoting teaching and learning. This view is supported by the study of Oganje et al. (2018) which found that understanding how students perceived different types of formative feedback utilised in online courses is imperative. Such information can help lecturers to make use of appropriate tools that would satisfy students' perceived expectations. Contrary to findings of Espasa et al. (2018) about inadequate feedback literacy among learners and faculty members, this study revealed through interviews and FGDs that students and faculty members have a good understanding of what feedback is. They referred to feedback as insight, input-output process or evaluation. Conceptually, the subject of students' perception of formative and interactive feedback used in online learning has to do with the students' level of understanding regarding formative and interactive feedback. Students' appreciation of existing feedback types is fundamental because Chiu and Churchill (2016), observed in their study that adoption of online learning in the teaching and learning environment influences students' perception about feedback management. The study findings, based on how students perceive formative and interactive feedback depicted that the level of appreciation of most of the sampled students regarding formative feedback was very high and that the students knew about the benefits of formative and interactive feedback of their academic prowess. Consistent with social constructivist theory, high interaction in the learning context is healthy and will move the students to the zone of potential development (Lowe & Lowe, 2010; Vygotsky, 1978). The results concur with Aoun et al's. (2018) prediction in their study that students' perception about existing feedback,

being summative or formative, tends to influence their learning capabilities. The findings further depicted that feedback from peers and lecturers helps most of the students to plan on how to organise their studies mean=3.57; SD=1.15). This finding which portrayed a significant difference in lecturers and student perception and the existing feedback practices is in consonant with that of Havnes et al. (2012).

The finding is also, contrary to Gilgun (2010) who maintained that learners become unaware of the things they think of or believe and how their interactions with others affect their learning outcomes unless they write about the existing beliefs and interactions and discuss them with others. Specifically, in terms of benefit, the highest proportion of the sampled students appreciated the fact that online feedback in the form of formative and interactive allowed them to set goals that helped them to monitor their learning progress. It was further explained in the interviews and FGDs that interactive feedback inspires and motivates students to learn. The ability to set own goals based on online feedback received is consistent with transactional distance theory in terms of more autonomy for the student (Alotibi & Millier, 2019).

The finding supports Meguid and Collins' (2017) study which found that students generally feel that utilisation of interactive inquiries tend to help them focus their attention on the things that were not always available in the usual lectures. Consistent with social constructivist learning theory such as the arguments of Bada (2015), the study's findings attempt to infer that considerable learning would take place through students' constant evaluation of the learning environment. In that regard, distance learning students will tend to assimilate lecturers' formative and interactive feedback based on their own experiences to develop an understanding (Stewart, 2013). Unexpectedly, the findings revealed that a significant number of the students remain indifferent when it comes to the existing interactive feedback regarding lecturers' engagement through online

feedback. The observation of students being neutral on existing interactive feedback in online learning could be attributed to the sampled students' dissatisfaction with the status quo, which is consistent with the findings of Andres (2017). It explains why understanding students' perception of feedback can minimise predispositions that students sometimes have regarding specific forms of formative evaluation based on interactive feedback. On the other hand, most of the sampled students acknowledged the existence of interactive feedback used in online learning concerning receiving comments from colleagues to aid understanding of specific topics in their course, the provision of useful information by peers during forum discussions to improve learning, and careful analysis of information from peers to improve learning and performance. This aspect of the findings welcomes the recommendation that students' learning experience will be enhanced if lecturers encourage their students to engage in peer assessment and evaluation of their online feedback (Ogange et al., 2018).

The findings form theoretical bases which are in line with social constructivists' central assumption emphasising that individuals try to understand better their environment in which they live and perform their task (Creswell, 2014). In that sense, a student can create subjective meanings based on constructive ideas and experience which are usually directed toward the meanings about specific objects introduced by a teacher. This buttresses Cannon and Newble's (2000) view concerning the tenets of socio-constructivist theories which emphasise the significance of interactive teaching and learning and their impact on students' motivation. Thus socio-constructivist theories associate effective teaching with methods of presentation that concentrate on interaction and discussion (Meguid & Collins, 2017). The findings relating to online feedback imply that distance education students would fully understand what is taught by their respective lecturers and do well academically when formative and interactive feedback techniques are employed in providing online feedback to the DE students.

5.4 Discussion of objective two based on Nature of Feedback

Some studies have maintained that the nature of feedback techniques developed by an academic institution as part of its curricula promote students' learning prospects and improvement (McLeod & Mortimer, 2012; Ruohoniemi et al., 2017). The study's analysis based on students' level of agreement, neutrality or disagreement regarding the nature of feedback used in the University of Ghana's Distance Education programme in terms of their transmission, direction, interaction, dialogue, correction and structure provided varied results.

Although most of the sampled respondents (students) acknowledged the existence of feedbacks that are dialogic, directional, interactive, corrective, and praise, their perception on the effectiveness of their nature was not satisfactorily positive (mean=2.67; SD=1.25). More so, both the focused group discussions and the interviews revealed the critical reason for directive feedback is due to large student numbers, work overload and lack of resources. Meanwhile, some prior studies have suggested that feedback would only be useful if it is based on conversational process and exchange (Boud & Molloy, 2013; Espasa et al., 2018; Nicol, 2010). Besides, Espasa et al. (2018) have argued that the nature of feedback components should incorporate dialogic feedback in each of them because dialogic feedback boosts learning improvement.

Contrary to these positions, the study findings revealed that the highest proportion of the sampled students agreed with the fact that the feedback comments they received told them what to do (directional/instruction) rather than questions on their opinions or ideas (mean=3.55; SD=1.33). The findings further showed that a high number of respondents agreed (mean=1.57; SD=1.39) the nature of feedback they received from lecturers provides suggestions on how to approach the assignment. Accordingly, the findings are similar to other studies that positive results are improved

when feedback is descriptive, precise, constructive, goal-oriented and conveyed in a language that is not judgmental (Duijnhower, 2010; Van der Kleij et al., 2012).

Furthermore, the results indicated that the highest percentage (43%) of respondents agreed that feedback was given in the form of praise. In comparison, a significant number, approximately 32% of students were neutral in their opinion. Most of the participants in the focused group discussions confirmed that feedback on tasks was in the form of commendation. The reason for giving commendations rather than giving feedback that helped students to interrogate issues further was the large student numbers that lecturers had to handle as revealed from the FGDs and interviews. Feedback in the form of praise hardly enhances student self-regulation and likewise will not improve student learning.

The neutrality of the highest percentage of the students on the praise form of feedback suggests that feedback usage may be minimal. Inadequate feedback provision was confirmed by the lecturers during the interview sessions. So large class sizes coupled with work overload resulted giving mostly praise feedback to students. This could perhaps concur with the claim that praising intelligent students for exhibiting a high level of intelligence may hinder their learning progress (Australian Institute for Teaching and School Leadership, 2019). Meanwhile, Van den Bergh et al. (2014) believe that feedback in the form of commendation can improve academic learning. Theoretically, the contrary views of the nature of feedback expressed by different researchers is an indication that the nature of feedback should be defined and utilised in different pedagogical environments. Lack of constructive feedback is an unhealthy practice from constructivists points of view and does not facilitate learning. Practically, however, lecturers and tutors at distance education at the University of Ghana need to develop skills to utilise a blend of dialogic,

interactive, and conversational forms of feedback to help enhance students' learning outcomes such as self-regulation.

5.5 Discussion of objective three based on Logistic Regression

The study of Eratl-Şirin and Şahin (2020) is one of the recent studies that utilised logistic regression to predict how students' demographic characteristics influence their learning outcomes. Also, some prior studies specifically focused on how the students' demographic characteristics affect their academic performance (Asunka, 2008; Horvat et al., 2015; Tagoe, 2013). The constant emphasis on the use of students' demographic characteristics in establishing their relationship with learning outcomes may be the rationale for Savvidou's (2018) assertion that the effectiveness of online academic improvement can best be ascertained when the demographic characteristics of both lecturers and students are known. This assertion, among other things, formed the basis for the assessment of the likelihood that distance education students' demographic characteristics predict their learning improvement, using logistic regression analytical tools as prescribed by Korkmaz et al. (2012).

Thus the findings gathered from the logistic regression analysis indicated that among the students' demographic characteristics such as sex, age, programme of study, and learning centre, only students' age (being young or older adults) was found to be a statistically significant ($p < 0.05$) predictor of learning improvement in the distance education programme. Comparatively, the finding indicated that the likelihood of young adult students' learning improvement was more than double (2.922 odds ratio) that of the older adult students' learning improvement. This finding is contrary to the prior study by Lai and Hong (2015), which found that factors relating to age had non-significant effect on students' adoption of online technologies to improve learning. Nevertheless, the finding relating to age-factor could be attributed to the fact that practically,

younger adult students at distance education are likely to have less responsibility to disrupt their learning activities compared to older adult students. The finding concurs with Kara et al's. (2019) study findings which emphasised that the learning challenges adult students faced depend on their age. Besides, some prior studies such as Horvat et al. (2015), Savvidou (2018), Voyer and Voyer (2014) maintain that sex of students is the best predictor of their academic achievements. However, this study found a negative, statistically non-significant relationship between students' sex and their learning improvement. Consequently, the finding indicated that male distance education students' likelihood of improving their learning outcomes was higher than female students. This finding though similar to that of Eratl-Şirin and Şahin's (2020) study, the logistic regression results showed that the likelihood of male students' academic progress was .944 times more than their female counterparts' chance of improving their learning success as compared to 1.427 times that of the earlier study.

The finding is also in agreement with prior studies by Boadi and Letsolo (2004), and Light (2013) that women are the ones more likely to put their careers on hold and take it up again later due to family roles they have to undertake including childbirth and sometimes the only option for these women in distance education. So when women are enrolled in distance education, they usually play many other roles with their academic roles, and these affect their chances of competing with male students (Voyer & Voyer, 2014). In terms of the different academic disciplines, the study's findings showed that students enrolled in social sciences (1.108) times more likely to improve their learning than those in the natural science disciplines. This finding is in tandem with Shaukat and Bashir (2016) who reported in their study that students who were into social sciences disciplines demonstrated highly significant academic prowess in learning than students who were into natural and physical science disciplines. Further, the study findings revealed that although the study centre had non-significant influence on learning improvement, the likelihood of improved learning for

students who had their learning centre in Accra was higher (1.402 more) than those who had their centre at Koforidua. The differences in students' learning improvement at different study centres confirm Kara et al.'s (2019) position that different tutors influence students' success in a distance education learning environment.

Precisely, a recent study by Asamoah (2020) found that students' demographic characteristics play a critical role in improving teaching and learning in the academic environment. However, this current study found that except for age, the rest of students' characteristics such as sex, study centre, and programme of the study showed statistically non-significant association with learning improvement. Consistent with the study of Aharony and Shonfeld (2015), online technology used for teaching and learning in the higher educational institutions connects lecturers and students in sharing of information, and that students' sex, study environment and programme of study sometimes do not count. The variations of existing relationships among students' demographic characteristics and learning improvement validate the social constructivist theory. The theory assumes that a critical strategy for classifying educational and technological instruments relating to different individuals' characteristics is to sustain collaboration in advanced educational institutions for significant interaction among learners (Williams, 2006). Adult learners need adequate and useful feedback from lecturers to sustain their learning goals and for learner achievement. Specifically, in assessing distance education students' learning improvement, proper attention should be paid to students' age distributions, particularly the older adult students whose likelihood of improving their learning outcomes seemed to be minimal compared to the younger adult students.



5.6 Discussion Based on Pearson's Correlation Results

Pearson's product-moment correlation analysis was used as part of the analysis to ascertain the degree or strength of linear association among feedback strategies (feedback timing, mode, target, quality and quantity), Sakai LMS, nature of feedback and DE students' learning improvement. The correlation analysis was based on the hypothesis that feedback strategies (feedback timing, mode, target, quality and quantity), nature of feedback and embedded course syllabus do not significantly influence DE students' learning improvement.

The evidence gathered from Pearson's correlation analysis indicated a statistically significant positive relationship between feedback strategies (timing, mode, target, quality and quantity) and DE students' overall learning improvement. Although all the feedback strategies had a significant positive association with learning improvement, the correlation between feedback timing and learning improvement was found to be higher, followed by the correlation between feedback mode and learning improvement, with the least being feedback quality and learning improvement. It is evident from the findings of the study that the hypothesis that there have no significant relationships between feedback strategies (timing, mode, target, quality and quantity) and DE students' overall learning improvement is found to be false. Respectively, among the variables that had a relatively high correlation with students' overall learning improvement were Sakai LMS, embedded online syllabus and feedback timing. The finding is in tandem with Nicol (2013), who concluded that user feedback is dependent on the time given. Additionally, Boud and Molloy (2013) concur that a curriculum devoid of feedback will not lead to reflective learning behaviours. Lecturers can thus, strategise to give feedback to students when feedback can be most useful in terms of directing their goals as well as to aid reflection on the subject matter for improved performance.

In terms of specific learning improvement, the data results depicted that online feedback embedded course syllabus, Sakai LMS and all the feedback strategies had a statistically significant association with learning improvement in terms of self-directedness, reflectivity, skills development in research and skill development in collaboration. On the other hand, the nature of feedback showed a significant association with learning improvement in skills development in research and skill development in collaboration. Nevertheless, the nature of feedback's relationship with learning improvement in self-directedness and reflectivity was not significant. These findings confirm Brooks et al's. (2019) observation on over six hundred studies conducted in recent times on the relationship between feedback and students' learning progress. Out of these numerous studies, a few recorded non-significant relationships between the existing feedback and students' academic improvement.

The current study contributes to the existing knowledge. This is because, although previous studies have attempted to examine the relationship between students' learning progress and feedback strategies such as time (Nicol, 2013), quality (Brooks et al., 2019) and target (Hattie & Timperley, 2007), none of them focused on how such correlations are established in online learning in distance education. Thus this study has not only bridged the gap by establishing the strength of correlation between feedback strategies and DE students' learning improvement but also, the role of the embedded course syllabus, Sakai LMS utilisation and the nature of feedback were factored into the analysis to broaden the scope of the study's findings. In addition, the degree of linear associations established among the variables of interest adopted in the correlation analysis is expected to provide policy guidelines to stakeholders operating distance education in Ghanaian universities.

5.7 Discussion of objective four and five based on Regression Analysis Results

Both Pearson's correlation and regression analyses can show a linear relationship between the dependent and independent variables (Schober et al., 2018). The limitation of correlation analysis is that it takes paired (two) variables at a time. Besides, correlation analysis is meant to establish the direction and degree of the linear relationship between two different variables. However, it cannot tell the magnitude of change that occurs in the dependent variable as a result of unit changes in the independent variables. Thus in order to overcome these limitations associated with the use of Pearson's correlation analysis, the study included standard linear multiple regression analysis as suggested by Greene (2012) and Schober et al. (2018), using the robust command in Stata, which allowed the use of more than two variables to predict the responsiveness of dependent variables when each of the independent variables used in the regression model varies by 1 unit. Specifically, the regression analysis employed in the study focused on examining how feedback strategies (timing, mode, target, quality and quantity) and embedded course syllabus influence students' overall learning improvement. The findings obtained from the regression analysis are discussed based on the study's fourth objective.

First, the regression analysis sought to examine how students' overall learning improvement is influenced by feedback strategies (timing, mode, target, quality and quantity). In assessing the impact of feedback on learners' academic outcomes, the study of Hawe and Parr (2014) found that most feedback targeted learners' academic achievement rather than the learning itself. However, the results indicated that all the feedback strategies, except for feedback target, had a statistically positive significant relationship ($p < 0.5$) with overall learning improvement. This finding is contrary to Hawe and Parr's (2014) study, which demonstrates that the quality of feedback which is learning-intensive was not always useful for students' learning improvement.

However, these findings are consistent with the study results of Hattie (2009), which indicated that feedback correlates positively with academic achievement in traditional learning spaces. In terms of the individual influence, the regression results indicated that the contribution of feedback embedded course syllabus in influencing learning improvement is the highest (Beta= 0.241), followed by feedback mode (Beta= 0.156), and timing (Beta = 0.146) with the least being feedback quantity (Beta= 0.133). This supports the evidence that quantity of feedback is necessary, as Hattie et al. (2017) argued that, useful feedback needs to be understood from the perspective of the number of information received by learners rather than what is given. In line with constructivists approach, lecturers facilitate a connected learning community through the volume of feedback provided (Deulen, 2013). Further, the timing of feedback is critical as delayed or untimely feedback proves to negatively impact students learning improvement as gathered from the qualitative responses. The students end up not utilising delayed feedback because it becomes irrelevant by the time they receive it.

The study findings, supported by empirical studies, provide a pedagogical foundation in terms of short and long term policy. Thus initially, priorities should be given to feedback strategies, particularly feedback quantity, mode, timing and quality when the management of the various universities run online distance education programmes in Ghana. Consequently, in putting in place measures aimed at improving students' learning outcomes, feedback targets could be given less attention and instead focus on the other feedback strategies when distance education practitioners are to make policy preferences among the various feedback strategies. This is critical because the study results indicated that only the feedback target had little influence on learning improvement. In terms of theory, the study finding elucidates that feedback strategies applied in online distance education could vary from timing, mode, target as well as quality and quantity. This is in tandem with the studies of Hsu (2016) and Peters et al. (2018). They found among distance learners and

on-campus students that online experimental learning relates positively with learning progress based on appropriate feedback.

The significant positive relationship between feedback embedded course syllabus (Sakai LMS) and learning improvement is contrary to the view of Li and Gao (2016) that it is challenging to utilise online learning system in conveying feedback and this can negatively affect learning progress. Practically, the regression model developed in this study can be adapted or adopted by policymakers for planning. Also, other researchers can adopt it in conducting their studies in the area of feedback strategies and their relationship with students' academic improvement, particularly, the public universities in Ghana who run online distance education programmes. Thus the methodology adopted in the study that yielded the data results can be subjected to replication in order to identify a gap that would warrant another study in different dimensions.

Brookhart (2012) recommended that teachers ought to choose the feedback mode that is likely to be most appropriate and sufficient to ensure that the information meant to enhance learners' academic progress will be received at all cost. However, it was gathered from the current study's findings that feedback quality, timing and feedback embedded course syllabus had a statistically significant influence on students' learning improvement. This finding is similar to that of the study of Rotsaert et al. (2018) which revealed that quality feedback received by learners from their assessors has a more significant impact on the learner's academic improvement. The findings further support other prior studies which elucidate that teachers' quality feedback exchanges with learners in the forms of instruction ensure integrated environments for learners that identify, form, motivate and affect learning motivation (Jackson et al., 2013; Tan et al., 2019).

Similarly, in their study, Brooks et al. (2019) found feeding back mode of feedback in the form of verbal comments provided by teachers to their students, as against written feedback in the form of

feeding back transferred from teachers to students. On the contrary, the present study considered both written and verbal feedback through an online learning management system. The study showed a statistically significant positive relationship between embedded course syllabus, feedback mode, feedback target and learning improvement. These study findings are consistent with that of Diab (2011), which depicted that both quality and timing of the feedback can play a significant role in learners' academic improvement. Compared to the study of Nicol (2010), the findings of the current study have shown that feedback provided through embedded course syllabus can significantly influence learning improvement. A structured course syllabus will further enhance the degree of autonomy at the students' disposal (Saba, 2002).

Peters et al. (2018) revealed that the techniques of feedback enhance students' academic motivation. In assessing the influence of feedback strategies and embedded course syllabus together on learning improvement, the present study's findings showed that only the feedback target had little influence on learning improvement. This is in line with the claim of Double et al. (2020) that the mode of feedback may vary considerably from detailed written and verbal reviews to quantitative among different students' performance ratings. Also, the findings corroborate with the study of Fonseca and Chi (2011), which confirms that feedback relates positively to learning outcomes.

The enhancement of learning outcomes depends on feedback (Hattie, 2009). However, a robust regression model is required to predict learning outcomes that are determined by different forms of feedback existing in an academic environment. In order to engage in comparative analysis, a standard multiple regression model was developed and estimated to test how fit they are in predicting DE students' learning improvement. Thus, the model was set out to examine how only feedback strategies (timing, mode, target, quality and quantity) predict the overall learning

improvement. The value of the R-squared ($R^2= 0.426$) indicates that 42.6 per cent of the overall learning improvement is explained by feedback strategies and feedback embedded course syllabus. This finding supports Hattie et al.'s. (2017) argument that there is a need to reconceptualise feedback in terms of how (mode) it is received by the learner rather than how the teacher gives it. Using feedback strategies and embedded online syllabus in predicting the overall learning improvement, the estimated R-square (0.429) showed that feedback strategies and embedded course syllabus explained 42.9 per cent of the variation in the overall learning improvement.

These findings resonate with Fyfe and Rittle-Johnson's (2016) claim that feedback is sometimes used as a core component of education practice and is essential to the academic growth and advancement of students. Overall, the findings provided by the regression analysis have theoretical bases that are similar to the study of Ajjawi and Boud (2017) who observed that students' responses to questions are not wholly dependent on the nature of the inputs, but by the kind of feedback instructors convey to them. However, from the Ghanaian perspective, while the finding of Asunka (2008) showed that students responded unfavourably to constructivist pedagogical techniques, perceiving online teaching and learning as a challenging experience, this current study's findings revealed from the FGDs and interviews that distance learning students and their lecturers are optimistic about using interactive and collaborative tools in Sakai LMS to provide and utilise feedback that may lead to learning improvement. More importantly, it should be emphasised that the study has established a verifiable multiple linear regression model to evaluate the influence of feedback strategies and feedback embedded course syllabus and on learning improvement of DE students at the University of Ghana. Theoretically, therefore, the regression model used in this study provides adequate guidance for academic research aimed at providing a comparative analysis of the strategies that pertain to various academic universities in Ghana. The added advantage of the analysis is that it connects theory and practice, and also discussed the different aspects of

feedback approaches and students' academic progress in online education provided to distance education students. These dimensions of findings are likely to serve as rich literature sources that can enhance the analysis of future studies within the purview of feedback strategies and their nexuses with students' learning improvement.

5.8 Discussion based on qualitative findings

The study finding obtained from the qualitative results through interview and FGDs indicated that feedback promotes awareness of what is expected of students so that they can maximize their learning. This support Hattie and Timperley's (2007) observation that students need clear feedback in order to allow them know how they are faring in relation to the academic performance criteria needed. Similarly, to Van der Kleij et al.'s (2012) supposition that previous feedback provided by instructors which is perceived to be helpful is likely to boost learner's confidence, and thereby produce good results, this study reveals that for students, feedback provision is about being conscious of what is required in performing their academic tasks and exercises. This belief is consistent with McLeod and Mortimer's (2012) contention that how feedback is given to learners counts. Perceptively, the findings have a clear cut practical implication that lecturers and students recognize that learning input allows them to exchange knowledge that offers insight into the quality of the course and promotes teaching and learning. In addition, the study demonstrates that distance education students' learning improvement relied on feedback strategy and some demographic characteristics of learners.

The findings confirm Price et al's. (2011) conclusion that provision of feedback by instructors without a conscious effort to engage specific categories of learners could be unproductive. Both instructors and learners in the University of Ghana's distance education aimed at finding the best way to interact through Sakai online system. The finding corroborates the position of Double et al. (2020) that instructor reviews would be best matched with assessment targets and will therefore

yield learners' improved outcomes. The results obtained from distance learning lecturers who teach their specific courses reaffirmed the awareness of the students that while there was both individual and group-targeted feedback, their usage was found to be limited.

The above observation is close to that found by Alqassab et al. (2018) that teaching different courses by particular tutors over time may increase the consistency of the feedback learners receive, but the results can be constrained by the level of specific subject expertise of a student. Thus a pedagogical foundation is provided on which the lecturers and students could evaluate available feedback strategies opportunities and the nature of feedback that would ensure student-lecturer collaboration in online teaching and learning. However, comparing the findings to prior literature, Ajjawi and Boud (2017) argue that that the feedback process starts with the provision of curriculum information on the essence of the role of students and the other behaviour the student assumes. Consistent with this view, the use of embedded syllabus to ensure online interaction between distance education lecturers and students is likely to strengthen the student-lecturer engagement without thinking about the long distance or close proximity. In this regard, the appropriate utilisation of online embedded syllabus to make available the needed academic information in reciprocal manner would help both the instructor and learner to collaborate usefully within the framework of academic goals and target.

Further, evidence from the data findings indicated that students and their lecturers have relatively appreciable understanding of what the concept feedback means relative to online teaching and learning. This corroborates with Brooks et al.'s (2019) supposition that it would always be appropriate for both instructors and students to have enough clarity about the best way of providing and acting upon the feedback they receive; and this is the duty of the instructor. It therefore appeared that the learners and lecturers, who are the principal pedagogical actors, comprehend

feedback as a way of assessing performance in the online learning context. This is analogous to Shute's (2008) discovery that feedback was typically viewed in educational research as a one-way teaching process through which the student is given guidance to modify actions and lead to comprehension.

However, in comparing the commonly used online feedbacks in the current pedagogical setting, the study findings pointed out that a more summative feedback which tends to be one-way was utilised frequently than formative feedback. This finding reflects the argument of Van den Berghe et al.'s (2013), based on existing evidence that while stressing the lack of two-way direct engagement, the primary mode of transmission of feedback from teachers remains passive rather than constructive. The novelty of the existing feedback supports the observed students' perception of formative and interactive feedback usage in the distance learning programme in the University of Ghana which seem to suggest that most of feedbacks that are readily available are suggestive rather than two-way or dialogic. Meanwhile, Espasa et al. (2018) have hinted that feedbacks that are elaborative and provide direction can enhance learning. However, the current existing feedback used in the in the online learning management system is not likely to encourage self-directedness and self-regulation that are required of students to improve their learning. Succinctly, the findings of this study can contribute to the further extension of the constructivists' theory of learning which has consistently been used to elucidate instructors' adoption of method reflectivity and group management learning which encourage students to regularly collaboratively evaluate their understanding of what they learn in order to be self-directed (Bada, 2015).

In practical terms, however, the findings points to a number of reasons why the nature of feedback should encompass different dimension such as conversational or interactive, corrective, dialogical, directional, formative and form of praise that are key to learning improvement. This is in line with

some prior studies (Ajjawi and Boud 2017; Boud and Molloy 2013) which emphasized that dialogic feedback improves learning outcome.

Similarly, AbuSeileek and Abualsha'r (2014) reported in their study that corrective feedback is one of the major tools used for enhancing learning and teaching by providing students with feedback to correct their error; while Wiliam (2011) also observes that an assessment that is based on formative provides learners with opportunities to obtain and utilise feedback with the intent of improving their learning outcomes. Additionally, Nicol and Macfarlane-Dick (2006) concluded in their study that teachers' ability to provide frequent, decisive and constructive form of feedback is the best way to improve students' learning. These thoughts and observations, consistent with the study findings, suggest that a blended feedback from the distance education lecturers to their respective students would meet the target of enhancing learning outcomes.

Predictably, both the feedbacks targeted at group (Ajjawi & Boud, 2017; Nicol, 2010) and individual learners, (Price et al., 2010) can have significant impact on students' learning outcome, if quality of the feedback is not compromised. This is incongruous with the stance of Brooks et al. (2019) that it is the quality rather than the quantity of feedback that is vital for feedback to be received and used by the learner. Coincidentally, the study found that the feedbacks from distance education lecturers are targeted more at the groups than individuals, which allow the students to peer assess themselves, and to also develop critical analytical thinking skills, collaboration and independence.

In line with prior literature the study findings bring to the fore that practically, feedback targeted at differentiated individual or a group of learners facilitates peer-group and student-lecturer interaction. However, ideally, all forms of feedbacks are expected to address the learning needs of

the targeted learners within the standard pedagogical environment (Boud & Molloy, 2013; Rotsaert et al., 2018). In its contribution to the broad knowledge, it is certain that this study finding offer theoretical explanations for the development of appropriate feedback strategies within the context of online distance learning.

5.9 Chapter Summary

This chapter has extensively discussed the significant findings which emanated from the data analysis presented in the preceding chapter. Thematically, several issues were discussed within the framework of the study's specific objectives. Specifically, the discussion focused on findings on how Sakai LMS was utilised by distance education students, formative and interactive feedback, feedback provision as part of the course syllabus, and existing feedback strategies used by lecturers to enhance teaching and learning. Both qualitative and quantitative findings were discussed to synchronise the study's findings obtained through the issuance of questionnaires, focus group discussions and interviews. The adoption of these methods provided room for further explanations and clarifications regarding some specific issues raised. Also, two sections of the discussion were devoted to establishing a statistical relationship among demographic characteristics, feedback strategies and learning improvement. The purpose was to confirm or invalidate the research hypotheses stated within the scope of the study's objective. Coincidentally, some of the study findings discussed were similar to other prior studies carried out to assess approaches used for feedback provision at the tertiary levels. However, in some instances, the study findings discussed differed from the results of other studies similar to this study. Among the critical emerging issues identified from the discussion include feedback benefits, constraints, and way forward to addressing the identified challenges.

The discussions on whether or not the identified feedback strategies significantly influence learning improvement of the distance education students were taken into consideration. Overall, in contributing to the existing knowledge, the discussion in this chapter highlighted the practical, theoretical and policy implications of the study's finding.



CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

In the preceding chapter, discussions of the data results were executed to elaborate on the significant findings that were discovered in the presentation and analysis of the study's results. Thus, based on the research questions and hypotheses, the discussion was done to elucidate what, how and why feedback strategies used in online learning influence learning improvement of distance education students who use Sakai LMS in the distance education programme at the University of Ghana. Therefore, this chapter, being the last chapter of the study, focused on the summary, conclusion and recommendation for policy implication based on the major findings of the study.

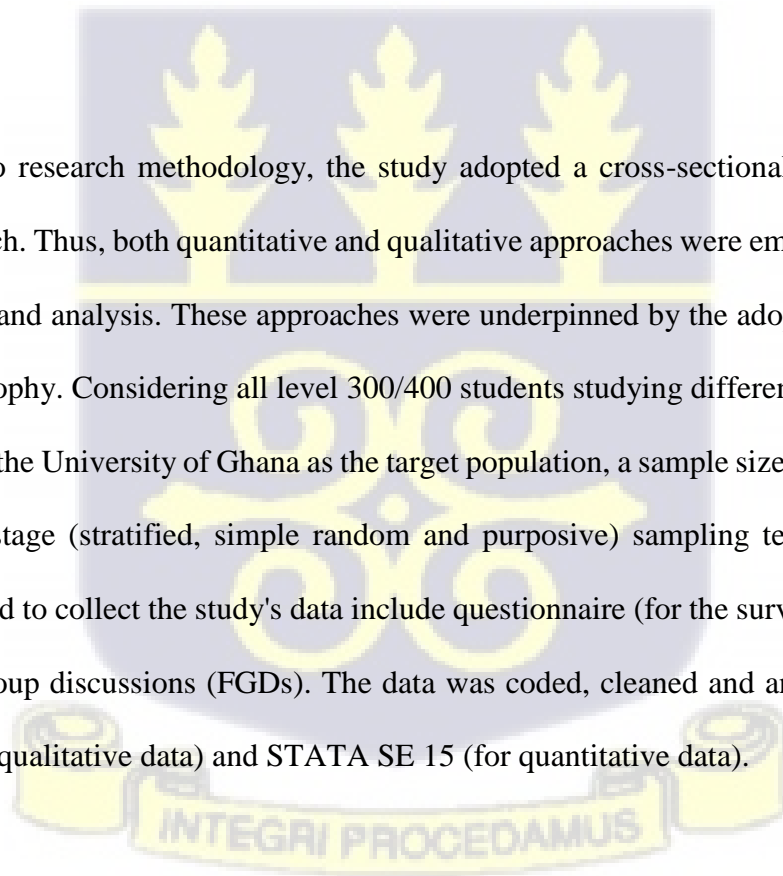
6.2 Summary of the Study

The study began with the introductory chapter, which focused on the study's background, statement of the problem, objectives of the study and research hypotheses. The primary purpose of the study was to assess the feedback strategies used in Sakai LMS and how they influence learning improvement using the Sakai LMS at the Department of Distance Education. In order to ensure that the study's broad objective was achieved, some specific objectives were set out to guide the study. Thus, the specific objectives were: to investigate students' perception of formative and interactive feedback usage in the Sakai distance education programme, find out the nature of feedback and how it improves goal-directedness in the Sakai online learning environment. It was also to ascertain which demographic characteristics (sex, age, study centre and programme of study) are more likely to influence learning improvement in the online distance learning programme; examine the effects of feedback strategies (timing, mode, target, quantity, and quality)

on learning improvement; and to examine the effect of the embedded syllabus on learning improvement.

More so, the significance of the study was spelt out to give a snapshot of the need to undertake the study aimed at exploring feedback strategies used in online learning and how they influence distance education students' learning improvement using Sakai LMS. Besides, the study reviewed the relevant literature aimed at providing a theoretical, empirical and conceptual foundation for the study. The constructivist learning theory and the transactional distance theory were considered as the main theoretical underpinnings for the study. On the other hand, both the conceptual and empirical issues centred on the usage of the learning management system (LMS), types, purpose and benefits of feedback, as well as challenges, management and application of existing feedback strategies.

With regards to research methodology, the study adopted a cross-sectional design and mixed-method approach. Thus, both quantitative and qualitative approaches were employed in the study's data collection and analysis. These approaches were underpinned by the adoption of pragmatists' research philosophy. Considering all level 300/400 students studying different distance education programmes at the University of Ghana as the target population, a sample size of 376 was obtained through multi-stage (stratified, simple random and purposive) sampling techniques. The main instruments used to collect the study's data include questionnaire (for the survey), interview guide and focused group discussions (FGDs). The data was coded, cleaned and analysed using Nvivo version 12 (for qualitative data) and STATA SE 15 (for quantitative data).



The quantitative analysis was descriptive and inferential, while the qualitative analyses were done descriptively (narratives). The qualitative analyses were done thematically based on the data result gathered through FGDs and interviews. On the other hand, as part of the quantitative analyses, frequencies and percentages, as well as logistic regression, Pearson's correlation and regression analyses, were employed to analyse mainly the data collected through the administration of questionnaires. Besides, factor analysis techniques were adopted to confirm whether the constructs used to generate the variables with the 5-point measurement scale was appropriate for any further analysis.

Furthermore, the findings which emanated from the data analysis were discussed at length to explain how Sakai LMS was utilised by distance education students, the level of feedback provision as part of the online syllabus, and existing feedback strategies used by lecturers to enhance teaching and learning. The discussion established the type of associations existing among some variables used in the study. The focus of the establishment of the relationship was on the influence of students' demographic characteristics, embedded course syllabus and feedback strategies on students' learning improvement. Finally, this chapter, being the last chapter of the entire study emphasised the study's summary, conclusion based on the essential findings and recommendations for policy implication and further research in the future.

6.3 Key Findings from the study

The study's analysis was done based on the specific objectives, and the significant findings derived from the data results are presented as follows:

Objective 1: To investigate students' perception of formative and interactive feedback usage in the Sakai distance learning programme.

- Students' perception of formative feedback depicted that the level of appreciation of most of the DE students regarding formative feedback was high represented by mean=3.51; SD=1.19.
- It was further gathered from the findings that students understood that formative feedback from peers and lecturers helps most of the students to plan on how to organise their studies. More so, the highest proportion of the sampled students appreciated the fact that online feedback allows them to set goals that helped them to monitor their learning.
- Concerning students' perception of the interactive feedback, it was found that most students acknowledged the existence of interactive feedback (Mean = 3.03; SD=1.20) used in online learning about receiving comments from colleagues to aid understanding of specific topics in their course, provision of useful information by peers during forum discussions to improve learning, and careful analysis of information from peers to improve learning and performance.

Objective 2: To find out the nature of feedback and how it improves interactive feedback in the Sakai online learning environment.

- The research findings from the descriptive analysis showed that the nature of feedback provision is directional and corrective. Feedback is transmitted rather than the use of dialogue and interaction represented by means= 3.67; SD=1.25.
- Feedback is targeted at the group more than the individual. Also, more written feedback is provided than oral and electronic feedback. The findings on the nature of feedback also suggest that useful feedback improves learning, motivates and inspires students to do better. Students are appropriately directed to achieve their learning goals.
- The study findings depicted that most of the DE students enrolled had a fair knowledge of how their assignments would be assessed or marked by their lecturers through the feedback they got from the online syllabus (37.4%) and that the probability that online feedback

would be provided as part of the course delivery in a clearly shown syllabus is high (41.1%). However, the findings showed that most of the lecturers found it challenging to cover each semester's online syllabus at the end of the semester (54.6%).

- The findings revealed that most of the sampled students were able to take quizzes online due to adequate training on the use of Sakai LMS that was given them after their enrolment. It was further discovered that lecturers make use of Sakai as well as emails to contact their students and send them relevant information, but usage of Sakai LMS by some lecturers was not frequent.

Objective 3: *To ascertain which demographic characteristics (sex, age, study centre and programme of study) is more likely to influence learning improvement in the online distance education programme.*

- The study's findings revealed that among the five demographic variables (students' sex, age, study centre and programme of study) examined in the study, age of distance education students was the only variable that had a significant relationship with learning improvement.
- Comparatively, it was found that the likelihood of young adult students (2.922) odds ratio having their learning outcome improved was found to be higher than that of the older adult students. In contrast, males' learning improvement was likely to be higher than that of the female students. Finally, students enrolled into the programmes of the social science were more likely to have their learning improved than those in the natural sciences, while distance education students who had their study centre in Accra were more likely to have their learning improved than those at the Koforidua centre.

Objective 4: *To examine the effects of feedback strategies (timing, mode, target, quantity, and quality) on learning improvement.*

- Findings from the correlation analysis showed that all the feedback strategies exhibited a significant positive association with students' overall learning improvement. However, Sakai LMS, embedded online syllabus, and feedback timing showed a relatively stronger correlation with learning improvement than feedback mode, target, quality and quantity.
- Findings gathered from the regression analysis indicated that except for feedback target, feedback strategies such as timing, mode, quality and quantity related positively significant ($r^2 = 0.429$; p -values <0.05) with students' overall learning improvement. However, the feedback target had an insignificant relationship with learning improvement. The other control variable, embedded online syllabus, also had a positively significant relationship ($r^2 = 0.429$; p -value <0.05) with learning improvement where p -values <0.05 .
- It was found from the regression analysis that jointly, all the feedback strategies (timing, mode, target, quality and quantity) significantly influence students' overall learning improvement. Thus approximately 43 per cent of the variation in the students' overall learning improvement is explained by all the feedback strategies.

Objective 5: examine the effect of the embedded syllabus on learning improvement

- The study findings depicted that most of the DE students enrolled had a fair knowledge of how their assignments would be assessed or marked by their lecturers through the feedback they got from the course syllabus and that the probability that online feedback would be provided as part of the course delivery in a clearly shown syllabus is high. However, the findings showed that most of the lecturers found it difficult to cover each semester's course syllabus at the end of the semester.
- The regression analysis findings further showed that merging of feedback strategies with the embedded online syllabus in linear multiple regression models had higher predictive

power on students' overall learning improvement than the use of only feedback strategies in predicting students' overall learning improvement.

6.4 Conclusion

Principally, this study set out to assess the feedback strategies used in online learning and how they influence learning improvement using the Sakai LMS in the distance education programme at the University of Ghana. Consequently, based on the study's specific objectives, the following conclusions were drawn to highlight the study's contribution to the body of knowledge:

First and foremost, the study concludes that distance education students at the University of Ghana are conversant with the use of Sakai LMS because they can take quizzes online, have discussions in Forum and Chatroom due to adequate training on the usage of Sakai LMS that was given to them after their enrolment. On the part of distance education lecturers, a conclusion can be made that most of them use Sakai LMS to contact their students and send them relevant information. However, the usage of Sakai LMS by the lecturers has not been as regular as expected.

Furthermore, a definitive conclusion is made based on the study's first objective to examine students' perception of formative and interactive feedback usage at the Department of Distance Education. The study concludes that most of the DE students' level of appreciation regarding formative feedback is encouraging. This conclusion is based on DE students' understanding that formative feedback from peers and lecturers helps most of the students to plan on how to organise their studies and to also set goals that help them to monitor their learning. However, interactive feedback is perceived as low. Thus students and lecturers' appreciation of what constitutes formative and interactive feedback is critical in promoting learning. This knowledge can be applied in different pedagogical dimensions to enhance teaching and learning.

Another conclusion that can be drawn from the study's findings is based on the evidence that the existing feedbacks that apply in online distance education are more of instruction or directional and transmission-based with a high level of praise than interactive, dialogic or conversational. Transmission-based feedback is likely to have a lesser impact on students' goal direction and learning progress than when instructors utilise all the available forms of feedback in the teaching and learning process.

More so, the conclude based on the study's third objective to find out which demographic characteristics (sex, age, study centre and programme of study) is more likely to influence learning improvement in the online distance learning programme that students' age significantly influences learning improvement. It then suggests that DE students' age is critical in Sakai online platform because students may be at difference cognitive levels due to their ages and that adult learners may be challenged in the provision of feedback. In this case, instructors need to treat all DE students impartially irrespective of their students' sex, study centre and programme of study. This is because students' sex, study centre and programme of study cannot make an appreciable impact on students' learning outcomes. Also, the study concludes that the young adult students, social sciences students and students in Accra DE centre do better academically than older adult students, natural science students and students who have their study centre at Koforidua.

Besides, the study concludes based on the findings gathered from the regression analysis that utilisation of feedback strategies such as timing, mode, target, quality and quantity in predicting DE students' learning improvement provided results that indicate that these feedback strategies have a significant joint positive influence on students' overall learning improvement. However, incorporating other variables such as embedded course syllabus into the regression model can best predict learning improvement than the use of feedback strategies alone.

Additionally, based on the fifth objective which sought to examine the effect of feedback embedded course syllabus on learning improvement, a conclusion is made that feedback embedded course syllabus provides a mechanism for students and lecturers to engage in reflective learning behaviours in Sakai LMS environment and can therefore, they can co-construct knowledge.

From the findings which emanated from the study, it can be concluded that the use of appropriate feedback strategies such as feedback timing, feedback mode, feedback target, feedback quality and feedback quantity can enhance both teaching and learning in distance education using Sakai LMS. Thus, the factor analysis for the study has proven that there exists a strong correlation between various feedback strategies and the students' learning improvement. In a nutshell, there is enough evidence to conclude, that, a combination of feedback timing, feedback mode, feedback target, feedback quality and feedback quantity as a measure of appropriate feedback strategies using five-point scale items employed in this study can yield reliable results in future studies. This is particularly critical when the study intends to assess the relationship between feedback strategies and students' learning improvement.

Overall, the study has shown that feedback strategies when they are well managed and applied by DE lecturers in Ghana would make a considerable impact on DE students' academic pursuit. Furthermore, evidence from several prior studies reviewed in this study showed that the utilisation of Sakai LMS is not pervasive in colleges and universities in most African countries. However, the narrative is gradually changing in Ghana, as the University of Ghana has taken the lead in LMS usage for blended learning for other universities to follow. Moreover, with the advent of COVID-19, opportunities are ripe for institutions to adopt LMSs. As profound as it may, this study has established the linkage between feedback strategies and how they influence DE students' learning improvement. Thus, in line with the study's findings related to the conceptual framework, it is

conclusively established that feedback strategies based on timing, mode, target, quality and quantity relate to both interactive and formative feedbacks which significantly influence DE students' learning outcomes. In a nutshell, it is further resolved that for DE students to achieve academic progress through feedback provision, the onus would be expected on the management of DE and their lecturers to adopt appropriate feedback culture that would integrate all the DE students onto the Sakai LMS for the common good of distance education in Ghana.

6.5 Contribution to knowledge

Based on the results, the current study contributes to the existing knowledge in the distance education literature in the following ways. First, the study tends to be a departure from previous studies that focused on qualitative approaches such as those of Tagoe and Cole (2020), Boateng, et al., (2016), and Asamoah and Oheneba-Sakyi (2017). Others were quantitative based such as those of Asamoah (2020), Asunka (2008) and Asunka and Freeman (2019). In other words, the strength of the current research lies in the adoption of mixed methods approach through the triangulation of questionnaire, individual interview and focused group discussions successfully in one study. Therefore, producing richer datasets than earlier research in the area.

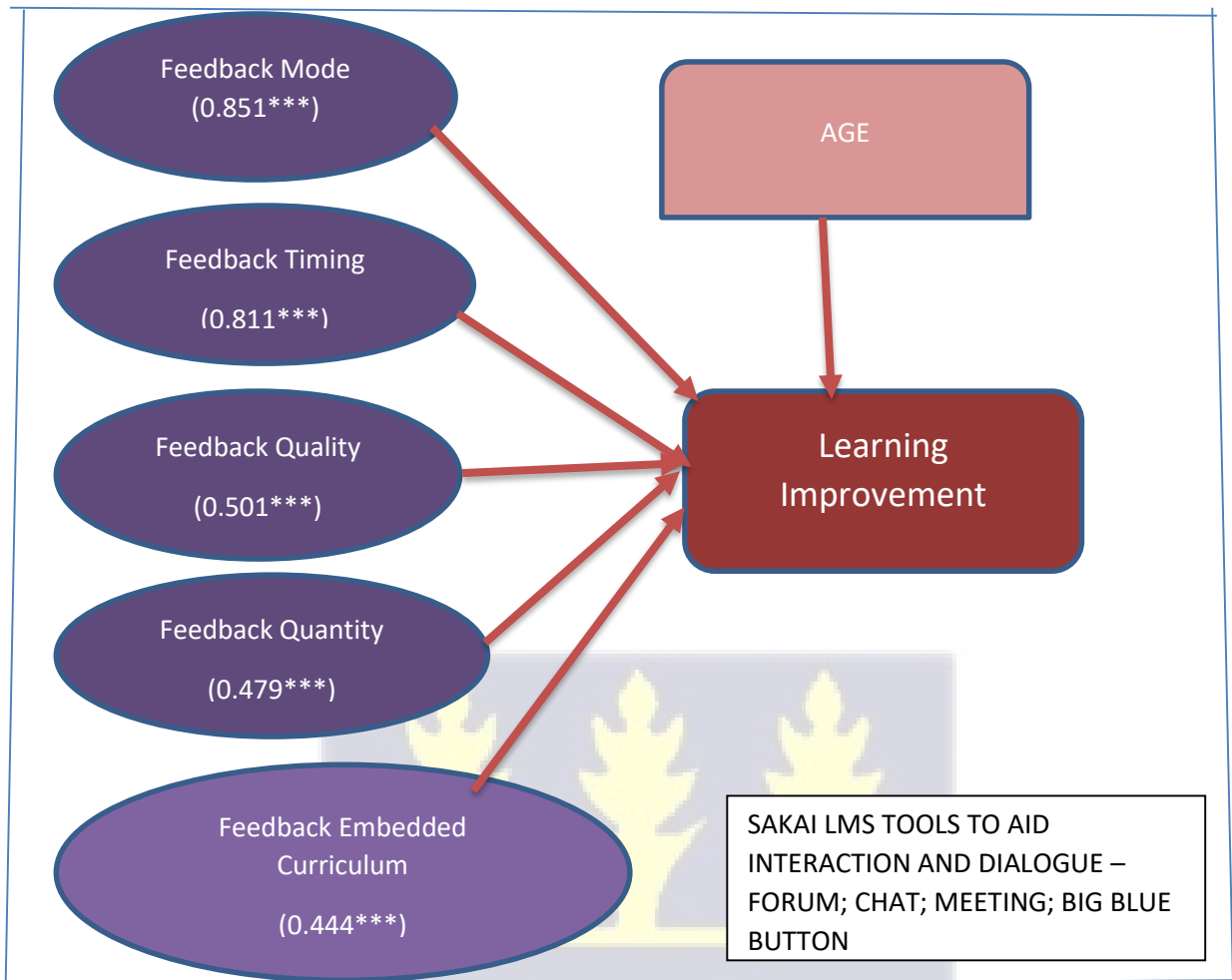
Second, the study has extended the relevance of feedback in the online learning context, which has previously been overlooked within the Ghanaian distance learning perspective. Empirically, this research is the first to examine the phenomenon of feedback strategies used to influence learning improvement from the viewpoint of lecturers and students in distance education in Ghana. While other studies focused on student dissatisfaction with collaborative online learning (Asunka, 2008), learning with videos in higher education (Boateng, et al., 2016), the use of Sakai LMS to alter the learning behaviour among students (Tagoe and Cole, 2020) this particular study added the feedback dimension of improving learning outcomes with online teaching and learning. The current study

findings revealed that distance learning students and their lecturers are optimistic about using interactive and collaborative tools in Sakai LMS to provide and utilise feedback that can lead to learning improvement.

Third, based on the logistics and regression analysis, the study adopted the model below as a framework for the implementation of feedback for learning improvement in online distance education programme. Thus, in line with the study's findings it is conclusively established that feedback strategies (based on timing, mode, quality and quantity) and embedded feedback syllabus significantly influence DE students' learning outcomes. Also, the age of DE students is statistically significant in influencing their learning improvement. The model therefore, supports the social constructivist theory of learning and transactional distance theory in expanding the frontiers of feedback provision in online settings.



Figure 6.1: Adopted model of implementation of feedback for learning improvement in online distance education programme



Practically, the regression model developed in this study can be adapted or adopted by policymakers for planning. Also, other researchers can adopt it in conducting their studies in the area of feedback strategies and their relationship with students' academic improvement, particularly, the public universities in Ghana who run online distance education programmes.

6.6 Implications for Adult Education and Human Resource Studies

The study was aimed at investigating the use of feedback strategies on learning improvement among undergraduate students and their lecturers in the Distance Education programme at the University of Ghana. The findings of this research has three pertinent implications. First, to remain relevant, educational institutions must design requisite pedagogical feedback embedded curriculum for teaching and learning. This is because providing various forms of feedback become the greatest link between students and lecturers. Second, the Department of Distance Education at the University of Ghana should organise workshops and seminars on feedback strategies utilisation with a focus on continuous assessment practices motivated through recognition, appreciation and continuous development. Third, for the sustainability of online teaching and learning at the UG, a policy on regular feedback usage is needed to establish a vibrant and creative online community.

6.7 Recommendations

In line with the exact findings and conclusions made, the following recommendations were made to give policy directions:

1. Objective one revealed that formative feedback usage is high. Therefore, higher education institutions need to incorporate formative feedback and encourage the use of interactive feedback in online teaching and learning.
2. The utilisation of Sakai LMS interactive tools such as Forum, Chatroom, Blogs, Meeting, should be encouraged by the Management of UGDE as part of new education policy for all lecturers and tutors, especially in pandemic situations that may not allow face-to-face meetings. This will encourage both students and lecturers to interact and share academic information at the comfort of their homes. This recommendation needs immediate attention because LMS usage has been identified as efficient and beneficial to both lecturers and learners.

3. Practitioners of distance education in Ghana should make it a part of the online teaching and learning policy for all tutors to utilise a mixture of feedbacks that are dialogic, interactive, corrective and suggestive than the over-used instructional and directional feedbacks that are likely to impede students' learning progress.
4. The management of universities in Ghana running DE programmes should, as part of their new code of conduct and teaching policy, formulate and implement a regulation that will spell out the reduction of lecturers' workload as well as the reduction of class sizes to encourage the use of Forum, Chatroom, Meeting tools. This will allow stakeholders to remain committed to using Sakai LMS.
5. In grouping DE students to undertake an assignment or project work, critical attention should be paid to age differentials since it has been established in the study (objective three) that the demographic characteristics of DE students can make a significant difference in online interaction between lecturers and students. It is further recommended that DE Department should, as a matter of urgency, monitor all instructors to ensure that all DE students are treated fairly regardless of their sex, study centre or programme of study. This is so because it is predicted based on the study's findings that students' sex, study centre and programme of study may not necessarily make a significant impact on their learning outcomes.
6. The fourth objective found that feedback strategies significantly predict students' learning improvement. Thus in the university's pursuit for an impact assessment on learning improvement, the focus should be on utilisation of interactive feedback. As an appropriate pedagogical strategy to enhance online teaching and learning, Management of University of Ghana running blended distance education programmes should develop a feedback-strategy framework to operationalise feedback timing, mode, target, quality and quantity

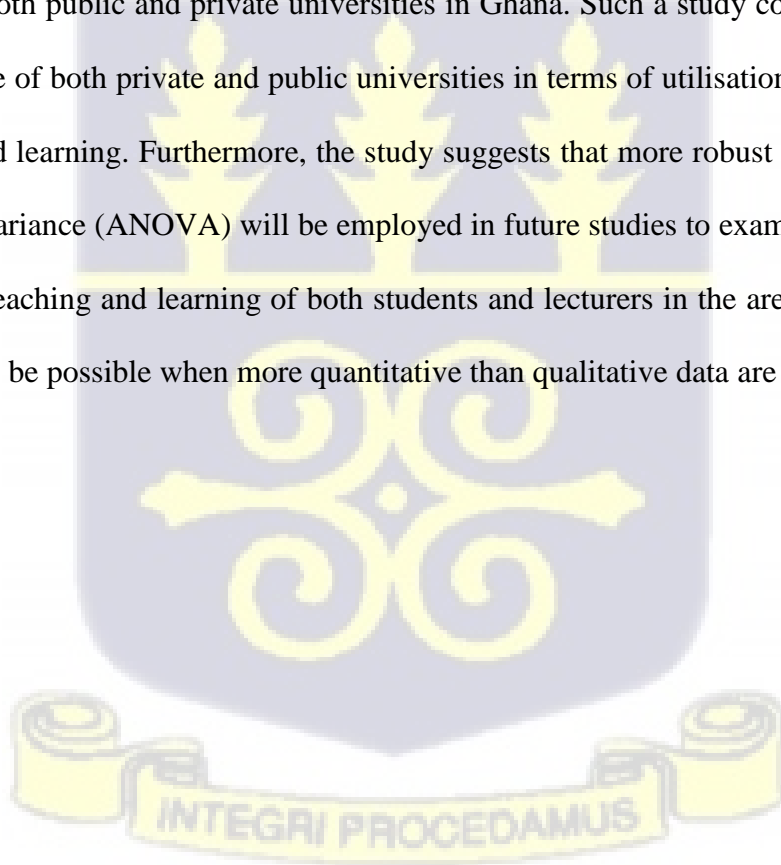
to meet world standards and best global practices incorporating a 100 per cent activity-based graded assessment.

7. Regarding the fifth objective, a focus should be placed on designing an effective feedback embedded curriculum. This would prompt the lecturers to be proactive in interacting and providing constant feedback to their respective students. Also, such a policy should form part of the DE Departments' Key performance indicators (KPIs) for assessing lecturers' competencies.
8. In setting learning improvement priorities practitioners utilising online teaching and learning in distance education in Ghana should focus more on developing appropriate analytical models that would focus on individual components of learning improvement rather than the general learning improvement. For instance, in examining students' learning improvements individually, this study found that the use of feedback strategies and feedback embedded course syllabus had high predictive power on students' learning improvement.
9. Management of Distance Education Department of the University of Ghana should, as a matter of priority, provide support and enhancement of the mini-computer laboratories with internet connectivity at the various centres where students can visit and interact with their respective lecturers regularly or as the need may be. Development of mobile phone applications for Sakai LMS could also facilitate the usage of the LMS by both lecturers and students. Also, special attention should be given to different age groups when it comes to the use of the Sakai LMS platform. This is necessary because it was established that DE students' age categories could make a significant difference in their ability or inability to use Sakai LMS.

6.8 Suggestion for Future Research

As expected, a study carried out in the pedagogical setting would invariably leave a gap that may need attention in future studies. More so, some limitations embedded in the study in terms of approach calls for further studies to be carried out to replicate the study's methodology in an attempt to validate or broaden the scope of the analysis.

In this regard, the study suggests that other future studies will focus on incorporating more public universities so that a larger sample size than what was used in this study could be used to ensure more representativeness for generalisation of the findings for policy implications. Thus, a sample size of 355 obtained from only the University of Ghana's Distance Education Department might not be representative of what pertains in the other nine public universities in Ghana. More so, in future, a comparative study on the usage of online platforms for teaching and learning could be carried out in both public and private universities in Ghana. Such a study could aim at assessing the performance of both private and public universities in terms of utilisation of online platforms for teaching and learning. Furthermore, the study suggests that more robust analytical tools such as analysis of variance (ANOVA) will be employed in future studies to examine the performance differences in teaching and learning of both students and lecturers in the area of online platform usage. This will be possible when more quantitative than qualitative data are used in the study.



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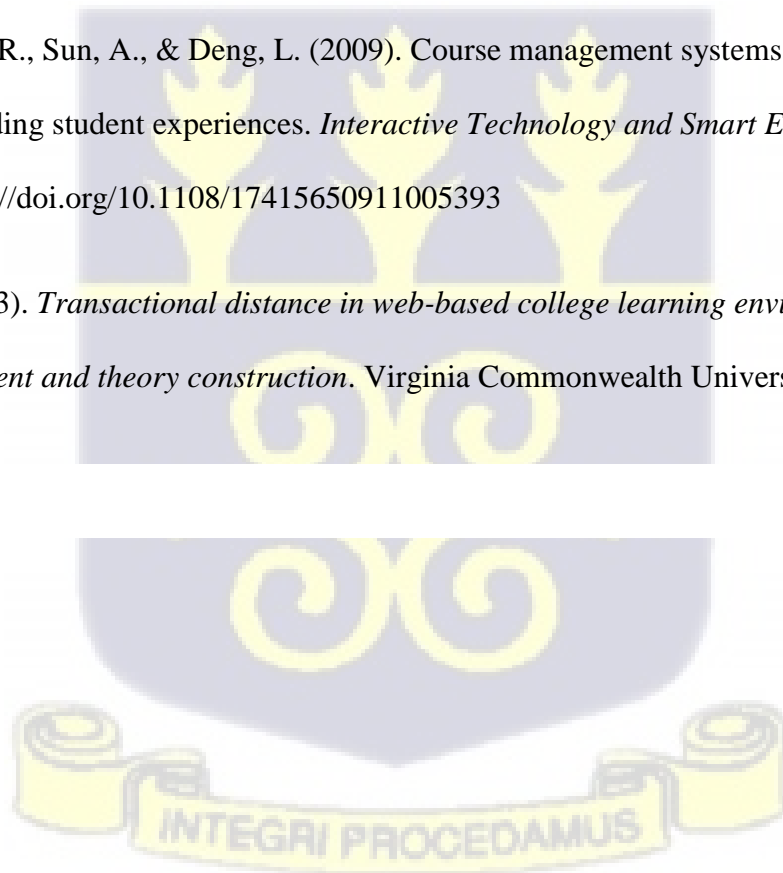
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APPENDICES

APPENDIX A: Questionnaire

STUDENTS QUESTIONNAIRE ON FEEDBACK STRATEGIES USED IN ONLINE LEARNING AMONG DISTANCE EDUCATION BACHELOR STUDENTS AT THE UNIVERSITY OF GHANA

SECTION 1: DEMOGRAPHIC DATA (Please tick as appropriate)

Gender	Male <input type="checkbox"/>	Female <input type="checkbox"/>				
Marital Status	Single <input type="checkbox"/>	Married <input type="checkbox"/>	Divorced <input type="checkbox"/>	Separated <input type="checkbox"/>		
Employment Status	Employed <input type="checkbox"/>	Self-employed <input type="checkbox"/>	Unemployed <input type="checkbox"/>			
Age	17-21	22-27	28-32	33-37	38-42	43-50 ⁺

Please choose the programme and UG Centre you belong to

BA BSc. ADMIN BSc NURSING BSc. INFO TECH
 ACCRA KOFORIDUA

SECTION 2: USE OF SAKAI LEARNING MANAGEMENT SYSTEM

Please indicate the extent to which you agree or disagree to the following statements. Where **1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree and 5=Strongly Agree**

	Sakai LMS Usage among students	1	2	3	4	5
1	I knew how to use LMS before enrolment into the programme					
2	I received training on how to use the Sakai LMS before using it					
3	I have received training on how to use Sakai LMS only once					
4	I received other training sessions while on my programme					
5	Course outcomes are communicated through Sakai LMS					
6	I download all resources (study materials) through Sakai LMS					
7	I use recommended links in Sakai LMS to access videos					
8	I am able to take quizzes online					
9	I am able to participate in threaded discussions using forum portal in LMS					
10	I check calendar and announcement tools regularly					
11	I visit the chatroom to join conversations of academic interest to me					
12	My lecturers ask us questions through the polls tool					
13	My lecturers use wikis and blog tools to interact with me					
14	I struggle to navigate the Sakai learning interface					
15	I receive individual assignments per course in a semester through Sakai LMS					
16	I work with more than one online group per course in a semester					
17	My lecturers/tutors use drop-box to interact with me or my group					

18	My colleagues and I use blogging in Sakai to discuss assignments					
19	I use drop-box in Sakai LMS to collaborate with my colleagues					
20	My lecturers/tutors use email in Sakai to contact me or send me relevant information					

SECTION 3: STUDENTS' PERCEPTION OF FORMATIVE AND INTERACTIVE FEEDBACK

This section focuses on your perception of formative and interactive feedback. Please indicate your agreement or otherwise regarding the level of formative and interactive feedback in the Sakai online learning programme. Which of the statement best describes your level of agreement? Where **1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree and 5=Strongly Agree**

	Formative Feedback	1	2	3	4	5
1	I understand that feedback is not only about marks obtained					
2	Comments on my work guides me to avoid mistakes or to better understand concepts in my assignments					
3	The comments I receive on my online assignments causes me to think and produce better work next time					
4	Comments on my work give me opportunities to gauge my own learning and improve my understanding.					
5	Feedback from peers and lecturers helps me plan how to organise my studies					
6	Feedback I receive online allows me to set goals that help me to monitor my learning					
7	I anticipate comments when I submit my assignments					
	INTERACTIVE FEEDBACK	1	2	3	4	5
8	My lecturers/tutors engage with me online based on the feedback they provide on my assignments or tasks					
9	My courses are structured to allow my colleagues to provide feedback on my online tasks/assignments					
10	Comments from my colleagues lead to my understanding of certain topics in my course					
11	I use comments from peers because they are knowledgeable					
12	I receive feedback from my peers during online discussions					
13	My peers provide useful information during forum discussions that I use to improve my learning					
14	I carefully analyse information from peers to help me to improve my learning and performance					
15	I am given opportunity to assess my colleagues' online submissions (either in forum, assignments or chatroom)					

SECTION 4: FEEDBACK PROVISION AS PART OF ONLINE SYLLBUS

Please indicate the extent to which you agree or disagree to the following statements in terms of course outline and outcomes. Where **1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree and 5=Strongly Agree**

		1	2	3	4	5
1	The syllabus clearly shows that feedback would be provided as part of the course delivery					
2	Lesson objectives are explained to me at the beginning of the semester					
3	Lesson objectives are explained to me at the beginning of every lecture					
4	I know the criteria through which my assignments will be assessed or marked					
5	Every topic in online syllabus is covered by the end of the semester					
6	Some of the topics to be covered are too much for one semester					
7	Topics in the syllabus are relevant for knowledge acquisition in my programme					
8	I ask questions about topics that are not clear in the syllabus					

SECTION 5: NATURE OF FEEDBACK USED IN ONLINE DISTANCE LEARNING

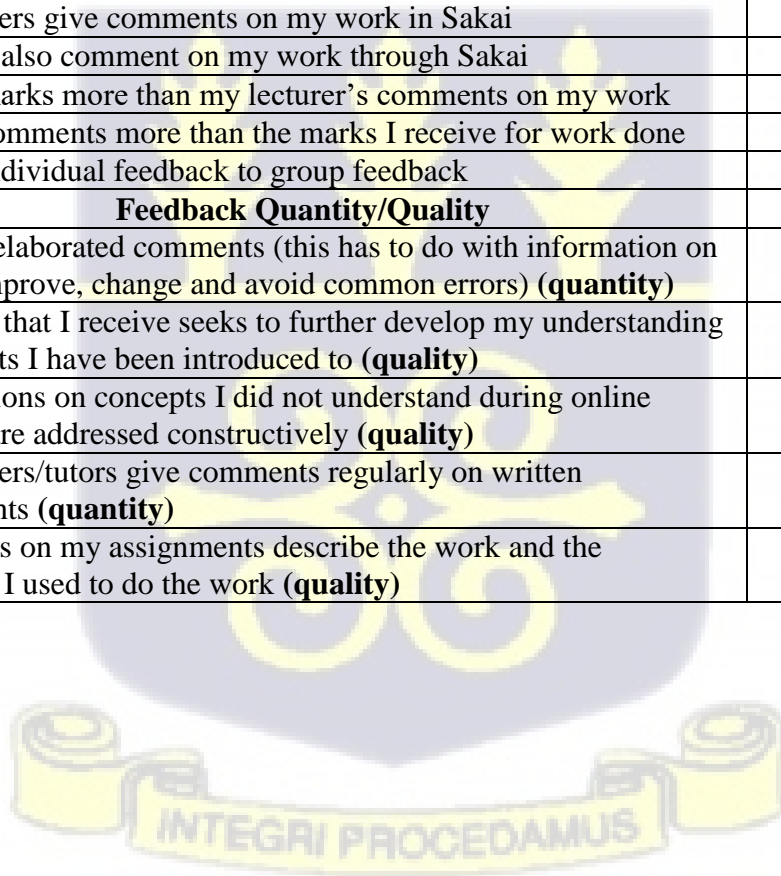
Please indicate the extent to which you agree or disagree to the following statements about comments you receive on your assignments and tasks. Where **1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree and 5=Strongly Agree**

	NATURE OF FEEDBACK USED	1	2	3	4	5
1	Feedback I receive from my lecturers is transmission or one way					
2	Feedback I receive from my lecturers is directional					
3	Feedback I receive is dialogic (two-way)					
4	Feedback comments we use in distance education is interactive					
5	Feedback I receive from lecturers provide suggestions on how to approach the assignment					
6	Feedback comments I receive tells me what to do rather question my opinions and ideas					
7	Feedback comments I receive on my assignments are corrective					
8	My feedback comments are mostly in the form of praise					
9	The feedback comments from my lecturers directs me to expand or explore my ideas further					
10	My lecturer's comments questions my opinions and directs me to look at other options					

SECTION 6: FEEDBACK STRATEGIES USED IN ONLINE LEARNING

Please indicate your agreement or otherwise regarding timing of feedback, forms and the types of feedback. Which of the statement best describes your level of agreement? Where **1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree and 5=Strongly Agree**

	FEEDBACK STRATEGIES	1	2	3	4	5
	Timing					
1	Clarifications are given before the assignment is produced					
2	Feedback comments are given as the assignment progresses					
3	Feedback comments are given after the assignment is produced					
4	I am given feedback on my submitted assignments early in the semester					
	Mode					
5	I receive written comments from my tutor/lecturer through Sakai					
6	I receive electronic (audio or video) feedback from my lecturers/tutors through Sakai					
7	My lecturers use symbols and diagrams when commenting on my work					
8	Written comments are tracked on my assignments					
	Target					
9	My lecturers give comments on my work in Sakai					
10	My peers also comment on my work through Sakai					
11	I prefer marks more than my lecturer's comments on my work					
12	I prefer comments more than the marks I receive for work done					
13	I prefer individual feedback to group feedback					
	Feedback Quantity/Quality					
14	I receive elaborated comments (this has to do with information on how to improve, change and avoid common errors) (quantity)					
15	Feedback that I receive seeks to further develop my understanding of concepts I have been introduced to (quality)					
16	My questions on concepts I did not understand during online sessions are addressed constructively (quality)					
17	My lecturers/tutors give comments regularly on written assignments (quantity)					
18	Comments on my assignments describe the work and the processes I used to do the work (quality)					



SECTION 7: FEEDBACK AND LEARNING IMPROVEMENT

Please indicate your agreement or otherwise regarding how feedback you receive improves your learning. Which of the statement best describes your level of agreement? Where **1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree and 5=Strongly Agree**

	Reflectivity	1	2	3	4	5
1	I am given enough time to complete my assignments					
2	Quality feedback from my lecturers helps me to construct or create my own knowledge about concepts thought in the course					
3	I use information from feedback I receive for my next assignment					
4	I ask myself questions after thinking about the feedback I receive					
5	I review or revise the ideas and thoughts I generate about the feedback or comments I receive on my assignments					
6	I pay critical attention to the comments I receive for personal development					
	Self-Directedness					
7	Comments on my work lead me to research so that I can do better at the next given opportunity					
8	I value comments that help me understand where I went wrong in my answer more than the marks for the work					
9	Feedback helps me know what to do as a learner					
10	I use personal constructive comments received to improve my learning					
11	Appropriate comments on my assignments has transformed the way I learn					
12	Positive comments are used to describe the work I do well					
	Skills Development					
13	Online feedback received from peers helps develop my collaboration skills					
14	Online feedback received from tutors/lecturers develops my research skills					
15	Due to appropriate feedback from my tutors, I can now work on multiple tasks					
16	My written and oral skills have improved due to effective online feedback between myself, tutors, lecturers, and peers					
17	I now appreciate online group work as a result of receiving effective feedback in online learning					
18	I have become more analytical in submitting my assignments due to appropriate feedback received online					
19	I have adopted innovative ways of studying because of appropriate feedback					
20	Feedback strategies adopted in Sakai LMS has enabled me to cope well as a student					

APPENDIX B: The Krejcie & Morgan (1970) Sample Size Determinant

Required Sample Size								
Population Size	Confidence = 95%				Confidence = 99%			
	Margin of error				Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	146	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1,067	427	636	827	1,119
1,500	306	515	759	1,297	460	712	959	1,376
2,000	322	563	869	1,655	498	808	1,141	1,785
2,500	333	597	952	1,984	524	879	1,288	2,173
3,500	346	641	1,068	2,565	558	977	1,510	2,890
5,000	357	678	1,176	3,288	586	1,066	1,734	3,842
7,500	365	710	1,275	4,211	610	1,147	1,960	5,165
10,000	370	727	1,332	4,899	622	1,193	2,098	6,239
25,000	378	760	1,448	6,939	646	1,285	2,399	9,972
50,000	381	772	1,491	8,056	655	1,318	2,520	12,455
75,000	382	776	1,506	8,514	658	1,330	2,563	13,583
100,000	383	778	1,513	8,762	659	1,336	2,585	14,227
250,000	384	782	1,527	9,248	662	1,347	2,626	15,555
500,000	384	783	1,532	9,423	663	1,350	2,640	16,055
1,000,000	384	783	1,534	9,512	663	1,352	2,647	16,317
2,500,000	384	783	1,536	9,567	663	1,353	2,651	16,478
10,000,000	384	784	1,536	9,594	663	1,354	2,653	16,560
100,000,000	384	784	1,537	9,603	663	1,354	2,654	16,584
300,000,000	384	784	1,537	9,603	663	1,354	2,654	16,586



APPENDIX C: Summary of Interview and FGD participants Demographic Data

Details of Participants – Interviews

Participants	Gender	Age	Position	Educational Level	Length of Service
1	Male	33	Assistant Lecturer/BA	Master of Philosophy	3 and half years
2	Female	43	Assistant Lecturer/ADMIN	Master of Philosophy	5 years
3	Male	40	Assistant Lecturer/CSIT	Master of Philosophy	3 years
4	Male	33	Assistant Lecturer/CSIT	Master of Philosophy	5 years
5	Female	45	Lecturer/NURS	Doctor of Philosophy	More than 5 years

BA: Bachelor of Arts

ADMIN: Bachelor of Science in Business Administration

CSIT: Computer Science and Information Technology

NURS: Bachelor of Science in Nursing

Source: Field data (2019)

Details of Participants – Students’ Focused Group Discussions

Participants	Gender	Age	Programme	Educational Level
1	Female	21	ADMIN	Level 400
2	Male	22	ADMIN	Level 400
3	Female	24	ADMIN	Level 400
4	Female	25	BA	Level 400
5	Female	23	BA	Level 400
6	Male	24	BA	Level 400
7	Male	28	BA	Level 400
8	Male	26	BA	Level 400
9	Female	24	BA	Level 400
10	Female	21	CSIT	Level 400
11	Female	20	CSIT	Level 400
12	Male	22	CSIT	Level 400
13	Male	22	CSIT	Level 400
14	Male	21	CSIT	Level 400
15	Female	22	CSIT	Level 400
16	Male	22	CSIT	Level 400
17	Male	27	CSIT	Level 400
18	Male	30	CSIT	Level 400

BA: Bachelor of Arts

ADMIN: Bachelor of Science in Business Administration

CSIT: Computer Science and Information Technology

Nursing students could not take part in the FGDs because of work and family roles.

Source: Field data (2019)

APPENDIX D: Ethical Clearance from University of Ghana



UNIVERSITY OF GHANA
ETHICS COMMITTEE FOR THE HUMANITIES (ECH)

P. O. Box LG 74, Legon, Accra, Ghana

My Ref. No.....

31st January 2019

Ms. Esther Julia Korkor Attiogbe
School of Continuing and Distance Education
University of Ghana
P O Box LG149
Legon

Dear Ms. Attiogbe,

ECH:034/18-19: Usage and Feedback Tenets in the Use of Learning Management Systems among Graduate Students at the University of Ghana

This is to advise you that the above reference study has been presented to the Ethics Committee for the Humanities for a full board review and the following actions taken subject to the conditions and explanation provided below:

Expiry Date: 31/07/19
On Agenda for: Initial Submission
Date of Submission: 19/11/18
ECH Action: Approved
Reporting: Quarterly

Please accept my congratulations.

Yours Sincerely,

Prof. C. Charles Mate-Kole
ECH Vice Chair

Cc: Prof. Yaw Oheneba-Sakyi, School of Continuing and Distance Education, UG
Prof. Olivia T. Kwapong, School of Continuing and Distance Education, UG
Dr. John Boateng, School of Continuing and Distance Education, UG



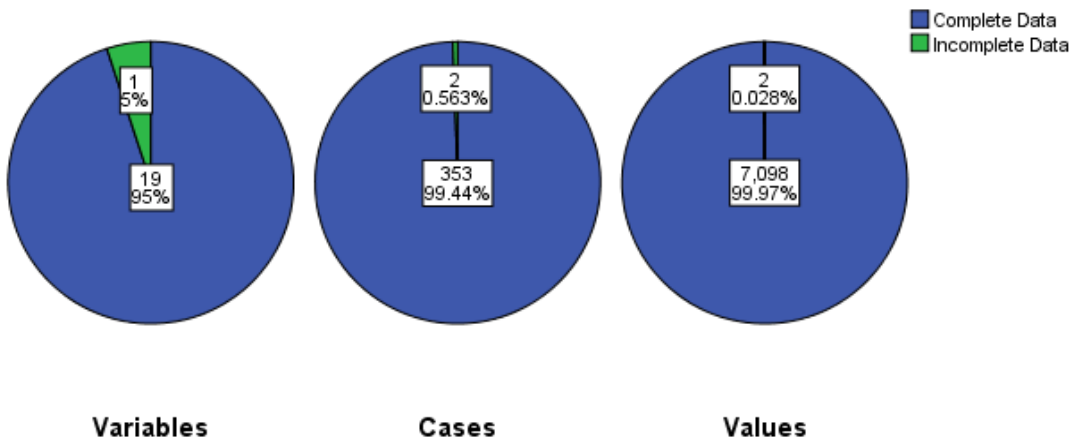
Tel: +233-303933866

Email: ech@ug.edu.gh

INTEGRI PROCEDAMUS

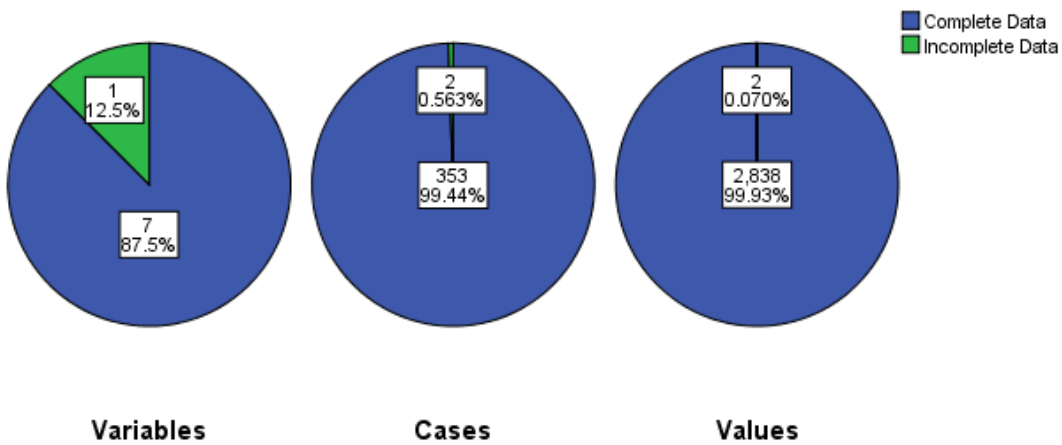
APPENDIX E: MISSING DATA FOR LMS

Overall Summary of Missing Values



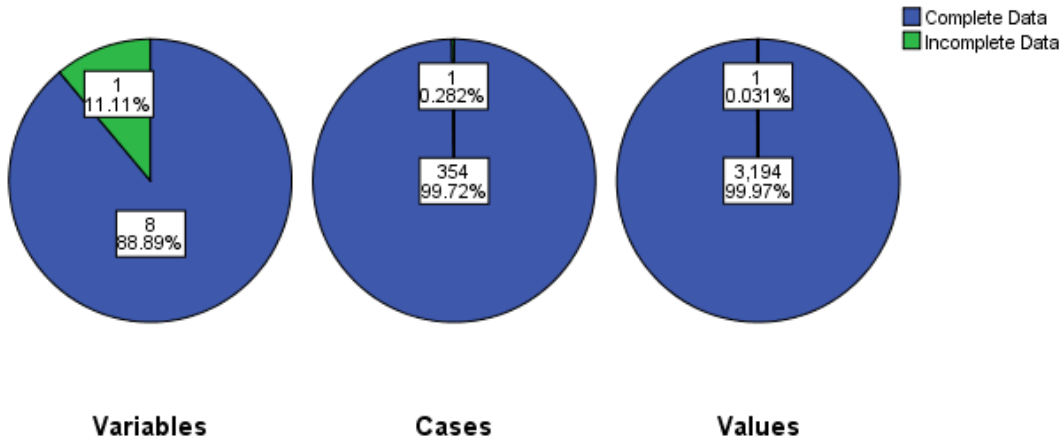
FEEDBACK PROVISION AS PART OF ONLINE SYLLABUS

Overall Summary of Missing Values



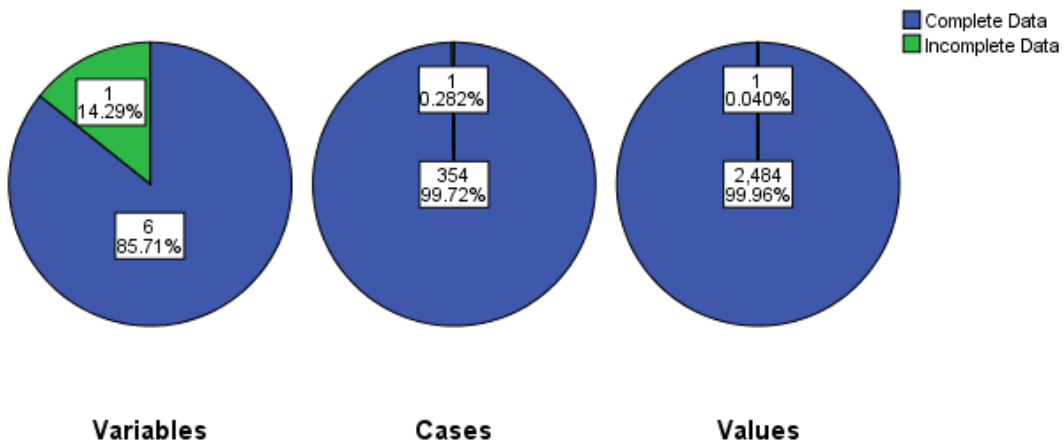
FEEDDBACK CULTURE IN ONLINE LEARNING

Overall Summary of Missing Values



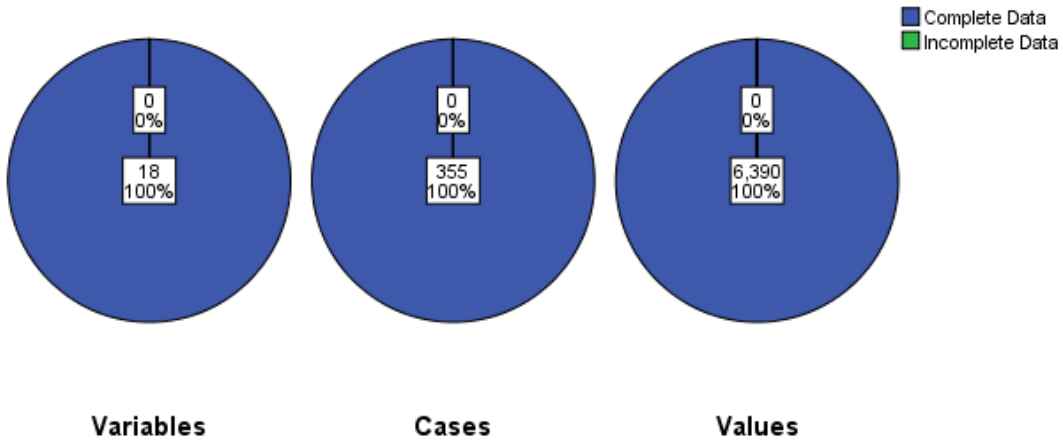
STUDENTS' PERCEPTION OF FORMATIVE FEEDBACK, REFLECTIVITY AND SELF-REGULATION IN ONLINE LEARNING

Overall Summary of Missing Values



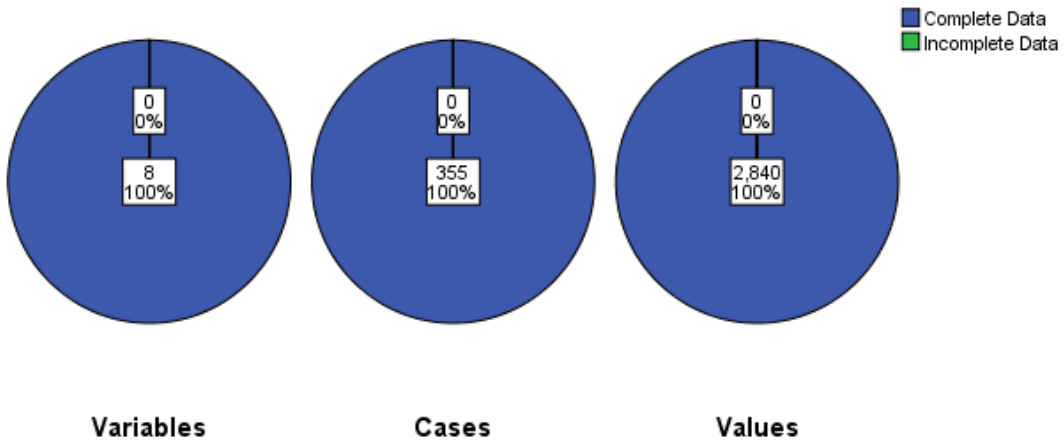
FEEDBACK STRATEGIES USED IN ONLINE LEARNING

Overall Summary of Missing Values



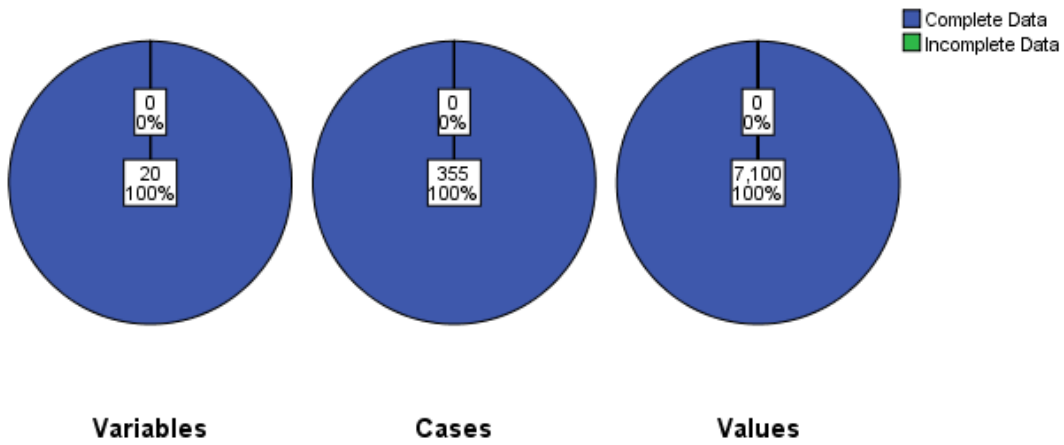
INTERACTIVE FEEDBACK USED IN ONLINE LEARNING

Overall Summary of Missing Values



FEEDBACK AND LEARNING IMPROVEMENT

Overall Summary of Missing Values



APPENDIX F: Common Method Bias of items

Total Variance Explained

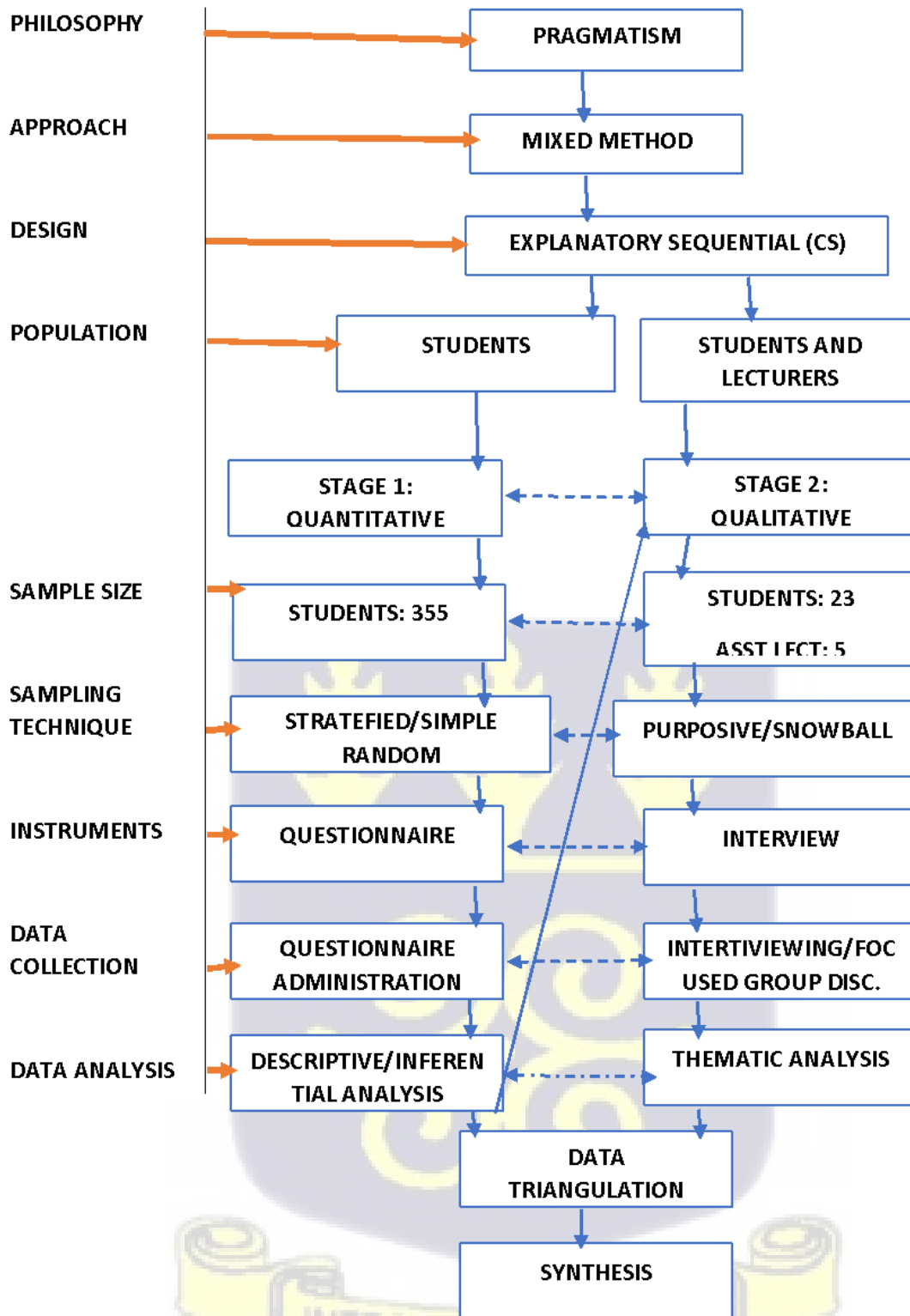
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	23.888	26.543	26.543	23.888	26.543	26.543
2	5.162	5.736	32.279			
3	3.264	3.627	35.905			
4	2.716	3.018	38.923			
5	2.239	2.488	41.412			
6	2.172	2.413	43.825			
7	1.907	2.119	45.944			
8	1.757	1.952	47.896			
9	1.717	1.908	49.804			
10	1.671	1.856	51.661			
11	1.440	1.600	53.261			
12	1.411	1.568	54.829			
13	1.307	1.452	56.281			
14	1.293	1.437	57.718			
15	1.274	1.415	59.133			
16	1.232	1.369	60.502			
17	1.138	1.264	61.766			
18	1.120	1.245	63.011			
19	1.114	1.238	64.249			
20	1.089	1.210	65.459			
21	1.071	1.190	66.649			
22	1.038	1.154	67.803			
23	.980	1.089	68.892			
24	.965	1.072	69.964			
25	.906	1.006	70.970			
26	.887	.986	71.956			
27	.865	.961	72.917			
28	.837	.930	73.847			
29	.797	.886	74.733			
30	.769	.854	75.587			
31	.747	.830	76.417			
32	.727	.808	77.224			
33	.706	.785	78.009			
34	.697	.774	78.783			
35	.683	.759	79.543			
36	.664	.737	80.280			
37	.637	.707	80.987			
38	.632	.703	81.690			
39	.609	.677	82.367			
40	.595	.661	83.028			
41	.566	.629	83.657			
42	.554	.616	84.273			
43	.543	.603	84.875			

44	.528	.587	85.462		
45	.516	.573	86.035		
46	.504	.560	86.595		
47	.497	.553	87.148		
48	.483	.536	87.684		
49	.476	.529	88.213		
50	.467	.519	88.732		
51	.439	.488	89.220		
52	.430	.478	89.698		
53	.405	.450	90.148		
54	.396	.440	90.587		
55	.389	.432	91.020		
56	.383	.425	91.445		
57	.374	.416	91.861		
58	.364	.404	92.265		
59	.359	.399	92.664		
60	.344	.382	93.046		
61	.325	.362	93.407		
62	.321	.356	93.763		
63	.313	.348	94.111		
64	.307	.341	94.452		
65	.296	.329	94.781		
66	.286	.318	95.099		
67	.280	.311	95.410		
68	.261	.290	95.701		
69	.256	.284	95.985		
70	.250	.277	96.262		
71	.246	.274	96.536		
72	.235	.261	96.797		
73	.226	.251	97.048		
74	.215	.239	97.287		
75	.211	.235	97.522		
76	.200	.222	97.745		
77	.191	.212	97.957		
78	.186	.207	98.163		
79	.180	.200	98.363		
80	.176	.195	98.559		
81	.165	.183	98.742		
82	.153	.170	98.911		
83	.143	.159	99.070		
84	.135	.150	99.221		
85	.133	.148	99.369		
86	.130	.144	99.513		
87	.126	.140	99.653		
88	.120	.134	99.787		
89	.103	.114	99.901		
90	.089	.099	100.000		

Extraction Method: Principal Component Analysis.

Source: Field data (2019)

APPENDIX G: Methodological Framework for Feedback Strategies



Source: Field data (2019)