Collaborative learning in E-Learning text based Asynchronous and synchronous learning communities by distance students in developing African countries: Its impact on student satisfaction and learning outcomes.

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Abstract

The study investigates factors that might affect collaboration of African students in an e learning environment. It investigates the most suitable E-Learning community for distance learners if E-Learning is to be considered as a delivery method in developing African countries. A group of Zimbabwean post graduate students studying for a Masters of Business Administration degree at the University of Zimbabwe's Graduate Management School were used to get data for this research. Questionnaires and tools like a short ASSIST 18 items, the COLI tool were used to get the data from the students. Statistical analysis showed that the study approaches do not affect the students' collaboration in the learning environment. The students' computer experience impact on their perceptions and attitude towards E-Learning. Age affect the student's attitude towards ICT in education. Distance students can collaborate more in an asynchronous learning community than in a synchronous community. There is no relation that can be established between satisfaction levels and the attainment of higher final scores. For higher education tertiary institutions to fully support distance learning using E-Learning there is need to consider the Asynchronous community.

Introduction and general research problem

This study researches the factors that might affect the collaboration of students in an E-Learning environment. Some of the factors that are investigated include computer experience, study approaches, and students' perceptions and attitudes towards the learning environment. According to Palloff and Pratt (2003), there are two main theories about gender issues in online communication. The first theory maintains that online communications is more equal and that women (and possibly the marginalized groups) are able to participate and complete thoughts in effect blurring barriers (Shapiro, 1997). The second theory holds that on line interaction is merely a reflection of real world conversation where men dominate. Men introduce more new topics; men ignore topics introduced by women and provide more traffic in a mixed gender environment (Herring 1993). Gender was one of the variables that were assessed with respect to their influence on collaborative learning on distance students.

In the literature, it is generally agreed that students' prior learning experiences, conceptions of learning, and study approaches underpin the quality of students' learning outcomes.

With the introduction of ICT in education, the question to ask is, does the use of technology as it elicit persona effect for learning, perception, experience, motivation, and engagement, contribute towards the learning outcomes.

The assumption being that if technology is used taking cognizance of those factors that have been found to influence the learning outcomes, then there are chances that this can positively affect the learning outcomes.

Many authors have argued that; students' prior learning experiences, learning conceptions, approaches, and outcomes are related. This position is explained in Prosser and Trigwell's (1999) 3P (presage-process-product) model.

This study focuses on the introduction of E-Learning as a new way of learning in the developing African countries. Very little research on the learning conceptions and study approaches is available in trying to determine whether the introduction of E-Learning will yield much towards improved learning outcomes.

This research focuses on the developing world with emphasis on Southern African students, the major questions being: What impact this new technology is having on the learning outcomes of the students in the learning process. What influence does the student's perception of E-Learning have on the learning outcomes? How can multimedia enhanced E-Learning communities be set up so as to benefit these students? The research tries to answer these questions taking into consideration the students' previous learning experience.

General research questions

Which E-Learning text based community is best suitable for the students learning under distance and open learning?
Is there any impact that can be brought about to the learning outcomes by the introduction of collaborative learning?

Hypothesis

H01:
Asynchronous e-learning community in an ICT text based environment is best suited for distance students as compared to synchronous E-Learning community.
H02:
A synchronous e-learning community in an ICT text based environment has a negative impact on distance learners as compared to the asynchronous learning communities.

Research setting

The research was set up at the University of Zimbabwe's Graduate School of Management. The school is under the Faculty of Commerce. The Graduate School of Management is offering some post graduate courses to students using the distance learning approach. Students come to the college two days a week. This is usually during the weekends specifically on Saturdays and Sundays. All the students enrolled in these courses are employed hence the choice of the

weekends. One of the post graduate programs that are very popular at the School Of Management is the Masters degree in Business Administration (MBA). This degree is so popular to the extent of attracting students from all over the country. This is giving a lot of problems to students who stay or work at far away places from Harare.

At the same time University of Zimbabwe has in the recent years embarked on an E-Learning project which is likely to see most of the courses offered by the institution being put on line. This is likely to provide a lot of solutions to the graduate school of management's problems.

The University of Zimbabwe's E-Learning platform known as Tsime is based on the Claroline platform environment. There were about three courses that were on that platform for the graduate school of management. This was the initiatives of the individual lecturers. The School of Management doesn't have a policy so far when it comes to the use of the E-Learning platform.

This research was conducted using the course of Business Information System (BIS). This course is done by the first year students for the Masters degree in Business Administration. It comes before the course of Management Information Systems.

In this study three groups were setup from the registered students. The two groups represented the two E-Learning communities to be considered (asynchronous and Synchronous and the third group was the control group.

Research design

The Participants

The research group consisted of the group of Masters in Business Administration (MBA) first year students studying Business Information Systems. The BIS course was offered by University of Zimbabwe's Graduate School of Management under the faculty of Commerce.

The class consisted of one hundred and eight three (183) registered students. Of the registered students, thirty six (36) students dropped out because of various reasons. The remaining students were one hundred and forty seven. Three females and thirty three (33) males dropped out. The remaining group consists of thirty seven (37) females and one hundred and ten (110) males. For the first survey all the (37) females participated.

Procedure

During the orientation days, information about the purpose of the study was given to the students. Prior to the start of the experiment and placing of students into groups the available students completed a brief questionnaire on computer experiences, perceptions and attitudes towards E-Learning.

The purpose was to assess the computer experience, attitudes and perceptions of the students towards E-Learning, to find out if there is any relationship between these variables that were likely to influence the collaboration during the experiment. This was administered to 127 students.

From this investigation it was noted that the students had the relevant skills and computer experience to work in the E-Learning environment. This might be so because the students were

studying for a post graduate course. There are chances that they have used computers in their previous courses.

Setting up of groups

Setting up of groups was done after the students were briefed about the two communities namely the Asynchronous community and the synchronous community. For a student to be a member of any of these communities, the student was supposed to have access to the computer and Internet either at home or at work. On the bases of the flexibility of the time one had access to the Internet, and then one could be the member of the Asynchronous community or synchronous community.

After explaining to the students that "electronic classes could be conducted either synchronously (real time or chat) or asynchronously, meaning that posting could be staggered" R. M. Pallof and K Pratt (1999), most of the students seemed to prefer the synchronous community. This was attributed to the students learning experience. They lacked the ability to regulate their learning process because their learning history was mainly the face to face, in which the learning process was controlled by the instructor.

After further explanation of the flexibility of asynchronous learning community especially for distance learners, there was then a fair distribution of students into the two groups.

The third group was the control group. This group was composed of the students who did not have access to the Internet regularly to use it as a learning tool. Initially these students felt that they were going to be disadvantaged, but after the assurance by the lecturer and the researcher that whatever additional material the two groups were going to get they were also going to get it but using the traditional way.

Instead of the targeted figures of 50:50:83 for the Asynchronous, Synchronous and control groups respectively, the groups ended up with 48:46:53 due to the dropouts.

The two groups representing the two communities were further divide into smaller subgroups at this stage. The synchronous and asynchronous groups were divided into three smaller groups. The subgroups for the synchronous group, two subgroups had 15 students and another had 16 students, while for the asynchronous, each group had16 students.

Variables analyzed at structure stage, such as gender, age, previous area of study, level of education and other contextual variables as well as technical variables were taken into consideration when dividing the groups.

Time

A period of 12 weeks was used to evaluate groups' collaboration using the e-learning environment. Students were given discussion topics and work in their groups. They would organize a plan of action required to tackle the related topic and learning issues and assigning individuals to undertake defined tasks. The course convener/tutor would facilitate the discussions in the different groups and monitor progress and collaboration.

Collaboration using the e-learning Environment

When students were given the discussion topics, they would use the e-learning environment to collaborate and the tutor would help in discussion monitoring and group conflicts. Comprehensive orientation was given at the start to allow interactivity with the e-learning

platform so that students would be less apprehensive and more confident in using the e-learning environment. Tutor‘s presence made the discussion more solution driven rather than ideas focused and more mutually oriented. Students were expected to reflect on other student’s views, criticize the ideas with facts or support the ideas also with facts. The collaborative discussion groups were facilitated by the e-learning platform so as to inspire students to interact and also to feel involved.

Discussion topics were given to different groups. The questions would contribute to their coursework marks. Questions were different for each group and had weighting for grading of marks. The discussions contributed to the students’ coursework as some of the related questions were asked in written assignments.

Data collection and instruments used.

The issue of collaboration can be influence by a lot of factors some of which needed to be assessed. To determine the learning styles, the studying approaches, a short ASSIST (18 items) Approaches to study of Entwistle was used. As for the conceptions of learning the COLI (32 item) of Purdie and Hattie was administered. A number of variables were used. The variables included individual learner’s variables, learning environments variables, contextual variables, and technical variables. The variables were divided into dependent and independent variables. Both the independent variables and the dependent variables were used in the experiment this was done at different stages since the others depended on other variables; some were assessed at the outcome stages. Data about these variables was gathered using a tool that was derived from items in the ASSIST. The focus was on the variables mentioned above.

Questionnaire

The tool consisted of 17 items these were derived from the ASSIST of Entwistle and each item was accompanied by a 5-point Likert scale, with 1 denoting the most disagreeable and 5 denoting the most agreeable. The questionnaire was categorized under the previous mentioned variables.

The individual learner’s variables, contextual and technical variables were used to measure the learning history, learner’s attitudes, learner’s motivation and familiarity with technology. The tool was mainly to determine the potential variables that would affect students’ collaboration and usage of the e-learning environment during the experiment.

Study Skills and approaches

The short version of ASSIST was used,it consisted of 18 items; each item was accompanied by a 5-point Likert scale, with 1 denoting the most disagreeable and 5 denoting the most agreeable. From the questionnaire the focus was on the Surface approach, Deep approach and Strategic Approach to learning.

The system usage

This was measured using the actual login count from the Tsime which the university of Zimbabwe’s E-Learning platform. Of much interest was the number of logins for the students and the tools accessed. As for the tools the number of times a student accessed it was also recorded. This was done to find out which tools the students were interested in. The idea was to try and associate this with the learning conceptions and study approaches. The researcher was interested mainly in the following tools and their respective codes.

Tool	**code**
Announcements	1,

Documents and links 2,
Exercises 3,
Chat 4

The codes were devised mainly for analysis purposes. The tools that were accessed the most times by a student was considered as his favorite tool, and was recorded as the most used by that student. There were cases of those who had more than one tool with the same number of login times. This was common for the synchronous group. The researchers associated this to the controlled nature of this community.

Satisfaction

This was assessed using the questionnaire that was designed by the researcher. Satisfaction was assessed at the end of the study. The satisfaction model was applied to determine students' levels of satisfaction in using the e-learning environment. A number of dependent variables were used to measure satisfaction in both the synchronous and asynchronous groups these included: Content presentation, Learning environment, Flexibility and extra links, Feedback, Access, Platform usage, Interface and Collaboration and support from other students

The tool was applied to the two groups the synchronous and asynchronous. The numbers of responses to the questionnaire from the Synchronous Group and the Asynchronous Group were 30 and 40 respectively.

The model was administered to students when they were about to complete their course. It consisted of 8 sections depending on the variables mentioned above. Each item was accompanied by a 5 -point Likert scale, with 1 denoting the most disagreeable and 5 denoting the most agreeable.

The questions from on questionnaire were given equal weighting and were classified according to the variables mentioned above. The responses to the model were captured. The reliability of each part of the evaluation questionnaire was established with Cronbach alpha 0.7. The analysis and findings of this model were combined with the coursework results, the final results and these were compared with those of the control group.

Statistical analysis

To determine the impacts on the learning outcomes statistical analysis for the various groups was done and results were used to determine the community which is suitable for the Zimbabwean distance students. This analysis involved the use of course work marks and the final exam marks.

General findings

After distribution of the questionnaire, from the synchronous group, a total of 24 students responded to the tool while from asynchronous a total of 40 responded.

Gender distribution

In the synchronous group who responded the gender distribution consisted of 16 male and 8 female while in the asynchronous 29 male and 11 female responded.

Age

Results showing age difference were grouped according to ranges for the two groups. Age was considered as an independent variable since it could affect the way students collaborate during the experiment. It can also determine the skill and attitudes as well as motivation.

Gender

General observation was that fewer women registered for the courses a total of 40 as compared to 143 male students. Maybe this was due to the nature of the course and the level. Gender imbalance is a major independent variable under the contextual variables, and it may affect the collaboration of students.

Previous field/area of study

Previous area or field of study was grouped as social sciences, pure sciences and communication sciences. The results also reveal that most students who do the course had done social sciences as compared to the pure and communication sciences.

Level of education

The level of education was classified as college diploma, tertiary degree and other. The results were 10:40:14 respectively.

General Discussion

The results reveal less women coming for further education after the first diploma or degree. Few women do postgraduates at the age of twenty-five to thirty years. The less women students might be due to the fact most female by that time will be married and having a family to look after. The thirty five to forty age groups revealed that far less female student were doing studies. This might be due to the social factors, where most women are contented with their working environment and do not want to further their studies. Females in the society are not really breadwinners so they do not want to overburden themselves in doing further studies.

Analysis of the validity and reliability of tools

In order to asses the validity of the instruments with the sample groups; cronbach's alpha was conducted to determine the consistence and reliability. For the assessment of the study approaches which was done using the ASSIST, the three approaches were validated. The internal reliability Cronbach's alpha were as follows

Surface .673,
Deep .653 and
Strategic .692.

The instrument to measure the intervening variables had eighteen questions and the questions were grouped according to attitude towards learning, organization, motivation, pressure of work, feedback on work and behavior towards learning. The reliability of the tool was also measured using Cronbach's Alpha at 0.7. The following results were obtained for the different variables.

Attitude to Learning: .**6838,**
Motivation: .**8030 ,**
Pressure: .**8574,**
Behavior: .**7887,**
Organization: .2973,
Feedback: .6442

Findings on the reliability

Using a Cronbach's Alpha Reliability coefficient of 0.7 the tool applied was reliable as three variables had Alpha greater than or equal to 0.7 and two others were closer to 0.7 with only one

variable not reliable. As for the ASSIST this being a well tested tool, previous researches have shown that it is a very reliable tool.

Analysis of the Variables

A set of assumptions and hypothesis were tested and analyzed using one way ANOVA tests.

Assumptions: _
The dependent variables are normally distributed. (Attitude towards learning, organization, motivation, pressure of work, feedback on work and behavior towards learning)
The two groups have approximately equal variance on the dependent variable.

Dependent variables against the 2 Groups (Synchronous and Asynchronous)

The analysis on the means was done on the bases of the following hypothesis:
Hypotheses:

Null: There are no significant differences between the groups' mean scores for the dependent variables.
Alternate: There is significant differences between the groups' mean scores for the dependent variables.

Results and Findings

From the results all the variables showed a significant difference (sd) value of greater than 0.05 to show that the variables are insignificant within the two groups. It means the dependent variables i.e. attitude towards learning, organization, motivation, pressure of work, feedback on work and behavior towards learning are not significant with the type of groups which are synchronous and asynchronous. This was mainly because the initial group settings have been selected as random so most students have the closer to the same background irregardless of the group that they were allocated.

The dependent variables against Gender

The following hypotheses were used during the analysis.
Hypotheses:

Null: There are no significant differences between the gender's mean scores for the dependent variables.
Alternate: There is a significant difference between the gender's mean scores for the dependent variables.

Results and findings

The results show that gender has no significance effect on the behavior, pressure, attitudes to learning, organization, and motivation. The significant difference was greater than 0.05 for all the variables. This might be mainly because since it was a postgraduate class where students enrolled would have resolved the influence of these variables at undergraduate studies or other previous. Gender does not have a significant difference in the way students are motivated, pressure of work, organization, attitudes to work even though the male students were more than the female.

The dependent variables against previous field of study

Hypotheses:

Null: There are no significant differences between the previous field of study' mean scores for the dependent variables.

Alternate: There is a significant difference between the previous field of study' mean scores for the dependent variables.

Results and findings

The results showed that previous field of study have a significance role in the attitude towards E-Learning. The **sd** was 0.037 less than 0.05 to show that previous area of study has a significant difference with the attitude towards learning. The post hoc tests homogenous tests show that the Pure Sciences and Social Sciences have mean level of prejudice higher than the Communication Sciences. This shows also that the previous area of study has equal variances with the dependent variables. This could have been so because students from different faculties have a different way of learning and access to technology.

The dependent variables against Age Group

Hypotheses:

Null: There are no significant differences between the age group' mean scores for the dependent variables.

Alternate: There is a significant difference between the age group' mean scores for the dependent variables.

Results and findings

The results showed a significance difference on attitude towards education and have an **sd** of 0.04. This is the same with self organization that have a significance difference of 0.03 and 0.05 respectively. Some age groups are more organized than others with age groups greater than forty (40) showing negative attitude towards the use of computers but being more organized than those students whose ages are less than forty (40).

The dependent variables with previous level of education

Hypotheses

Null: There are no significant differences between the previous levels of education's mean scores for the dependent variables.

Alternate: There is a significant difference between the previous level of education' mean scores for the dependent variables.

Results and Findings

The results showed that the previous level of education has no significance with the dependence variables since the significant values are greater than 0.05. The significance difference with the mean score for the independent variable shows that most have attained a first degree (a bachelor's degree).

Analysis of the Satisfaction results

The satisfactory questionnaire had eight variables which were being tested. The variables as stated earlier. The model was applied to determine the levels of satisfaction of students by the learning environment taking into consideration the different variables associated with the community in which they were members. Results of this analysis did help us to identify if there is any community in which the students are more comfortable than the other. This also helped us to propose the most suitable community taking into consideration the impact on learning outcomes.

The reliability of the Satisfaction Model

The reliability was calculated using Alpha 0.7 most of the variables showed values greater than 0.7 except for two, Platform usage .321 and Feedback .450, hence the tool was reliable.

Analysis of the variables

Assumptions: _

The dependent variables are normally distributed. (Interface, access, collaboration with other students, feedback, platform usage, learning environment, content presentation and extra link)

The two communities (synchronous and Asynchronous) have approximately equal variance on the dependent variable. The results showed that some variables had a significance difference between the two communities.

Extra links

The two groups differ on extra links. The result is due to the fact that the asynchronous groups mainly had enough time on the e-learning platform and hence have time to explore the extra links.

Content Presentation

The comfortability of students was significantly different with the groups. This was the same with work material to be discussed. Students felt as if they were different mainly because of the discussion topics applied and given which were different. This showed as if the objectives of the course are different from one group to another.

Learning environments

The two groups significantly showed difference on the usage of the e-learning environment as some groups were able to share the experience using the e-learning environment especially the asynchronous environment. This was also further analyzed using the actual login counts.

Feedback

The feedback was expected to be different between the two groups as the asynchronous had more time to check the platform or the alternative e-mail that was used.

Access

There was a significant difference in the accessing as they were some problems with the platform during the course.

Platform Usage

The synchronous group rarely logged on to the Internet daily and they preferred using their e-mails for communication. This was mainly due to the controlled nature of times.

Collaboration and Support from other students

The collaboration and support from other students were significantly different from the synchronous and asynchronous groups. The asynchronous supported each other more as compared to the synchronous.

Findings from the Satisfaction

The results showed a major difference in the level of satisfaction between the two groups. The Asynchronous shows collaboration but less satisfaction in using the e-learning platform while the synchronous show very little usage and no collaboration. This might be because some other students are not comfortable with the times they were supposed to log on to the system so as to use the e-learning platform especially those in the synchronous group. But those times they manage to login they could communicate/ collaborate as there was always at least someone to share information with. The asynchronous students could discuss before using the platform while the other groups could not feel the presence and effect of the platform. Hence the asynchronous managed to get more access extra links and feel the e-learning environment.

Analysis of Marks

This was done to assess the impact on the learning outcome. The independent variables were the groups and gender while coursework mark, final exam mark and the total exam mark were the dependent variables. The results were used to measure the impact on the outcomes. Of interest on marks were the coursework marks and the final marks. A set of assumptions and hypothesis were tested and analyzed using one way ANOVA tests and T distribution.

Group Analysis

Assumptions: _
The marks are normally distributed. (Coursework, exam and final mark)
The two groups have approximately equal variance on the marks.

The Total Course work mark has a significance difference of 0.001 to show that the two groups were different but on final exam mark and total exam mark there is no difference.

Gender Analysis

Assumptions: _
The marks are normally distributed. (Coursework, exam and final mark)

The gender has approximately equal variance on the marks. Gender has no significant difference to performance between the two groups as **Sig** is greater than 0.05.

Analysis of Synchronous, Asynchronous and Control Group

The groups were tested using the T-Test distribution.

Asynchronous and Control
Using the Levene's test of equality the significance difference on the coursework between the control and the asynchronous group of 0.001 shows that the two groups have equal variance on the coursework marks since it is less than 0.025.

Synchronous and Control
For the Independent sample tests and the results which is a two tailed significance shows that there is no difference between the synchronous and control groups in as far as the performance graded by marks.

Synchronous and Asynchronous

The results show that the asynchronous have a greater mean level of prejudice as compared to the synchronous.

The results showed significance difference of mean on a two tailed to be 0.000 to show that the two groups are 100% different. This proves the first hypothesis that **Collaborative learning in an ICT text based synchronous community has a negative impact on the learning outcomes as compared to the asynchronous learning communities.**

General Conclusion and Recommendations

The investigation to determine variables that might affect collaboration and usage of the e-learning environment did not show much difference as the students are postgraduate students who are different from undergraduate students. Another research should be considered with an undergraduate class. Age tends to affect collaboration, attitude towards E-Learning and usage of the e-learning environment as younger students are somehow computer literacy mainly because due to the evolution of ICT. But in developing countries this can be a temporary issue as these nations continue to introduce computers at all levels of education then the learning experiences will change.

The Satisfaction model showed that the asynchronous groups can collaborate more but the students are not comfortable in using the e-learning tool. The cause may be that many students are still comfortable with the traditional way of lecture delivery. They have not migrated to the modern way of using the e-learning tools. The Asynchronous communities allow students to make more use of the provided extra link as the students are not tied down in terms of time as to what they should do. This can allow them to navigate the platform and access important materials, but collaboration is minimal as times they can logon to the system alone and fail to get immediate feedback from fellow students.

The outcomes were measured on performance using course work and final exam marks. The coursework marks were reflective of a well judged result that was dependent on the usage of the system. The exam mark showed no significance to the three groups because when students write the final exam they did not use the e-learning platform hence students can perform very well despite the way they could have been collaborating and using the platform. This is also due to the fact that some of these students are used to a learning experience in which the final performance of the students determine his result. A student could relax the greater part of the course and only to work read at the end in order to pass the final exam. The Exam marks for the students also did not have a significant difference. Using the coursework marks where collaboration also contributed to the marks is of importance. The results using these marks show that collaboration in an asynchronous group yields a positive impact as compared to the synchronous group. The asynchronous group is suitable to the Zimbabwean distance students. The analysis on the means of course work marks shows that the higher mean is for the Asynchronous community.

Conclusion

Many students especially in Zimbabwe still are satisfied with the traditional mode of learning and they still lack a strong IT background. Collaborative learning using the synchronous text based learning environments is not ideal to the Zimbabwean distance learning. The Asynchronous E-Learning communities suits Zimbabwean distance education students and can play a major role in transforming learning experience and bring many students closer to their work therefore increasing satisfaction by solving some of the distance learner's problems. This will in turn lead to improved learning experience and improved learning outcomes. However there is need to

improve the connectivity in Zimbabwe as this can affect most of the ICT initiatives in order to improve the life of the learners.

Although the students in this study did not use the e-learning environment in all the ways intended, they perceived the environment to be a valuable resource. It was however noted that e-learning, by itself, will not drive up student test scores, nor will it ensure educational equity for all learners. It only promotes flexibility in time and pace of study where learners are able to work at a time of their choice and devote as long as they wish to the online activities. It therefore means for e-learning to bring the maximum possible results, there is need for students to develop strategies to fully utilize the e-learning. They need to develop strategies for using their time more effectively in order to engage in online work.

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