**Investigating the mediation effect of Self-Regulated Learning in the relationship between Collaborative Peer Learning and Online Learning Satisfaction in some Universities’ blended learning courses in Cameroon**

**Abstract:** This study sets out to measure ifcollaborative peer learning influences online learning satisfaction through self-regulated learning as a mediator. The study uses a correlational research design to investigate the relationship between the variables. A sample is gotten from the students offering general courses in the 2023/2024 academic year in HTTTC Kumba of the University of Buea. Of the 262 copies of the questionnaire that is administered, 256 copies of the questionnaire was returned. Linear regression is done through the SPSS statistical package to get the mediation analysis and the Sobel test was used to verify the significance of the mediation effect. The findings show that students’ ability to learn collaboratively with their peers significantly influenced their self-regulated learning skills while self-regulated learning skills showed a statistically significant influence on online learning satisfaction. The results from the Sobel test further corroborates that the effect of collaborative peer learning on online learning satisfaction was fully mediated by self-regulated learning. The results of this study bring awareness to university stakeholders to the mediating role of self-regulated learning in a blended classroom. This will help them make pedagogical informed decisions in blended course creation. It was recommended that Instructional Designers should incorporate aspects of self-regulated learning strategies when designing for blended learning to help students develop self-regulated learning skills. Moreover, teachers could use other practical methods to promote self-regulated learning like teaching in a cohort model; providing mechanisms for learners to track their progress etc.

**Keywords**: Blended learning, self-regulated learning, collaborative peer learning, online learning satisfaction, mediation effect

**Introduction**

Rapid advancement in technology is one of the factors responsible for the changes in Education today thereby giving rise to innovative ways of learning. One of such innovative learning centres on online learning especially in higher education. Online learning has helped in overcoming some of the short comings of a traditional classroom. However, students in online course frequently complain about satisfaction which sometimes leads to their drop out. Collaborative learning amongst peers has been shown to have positive effect on the experience of some of these students involved in online learning. One of such positive outcomes is self regulated learning which the students develop as they collaborate with one another in the online space. The use of learning management systems has made this very feasible and effective. A self regulated student has a higher probability of deriving satisfaction from an online course. Thus the researcher set out to look at the mediating effect of self regulated learning as a mediator between collaborative peer learning and online learning satisfaction.

Specifically the study had the following hypotheses:

1. Collaborative Peer Learning influences Self-Regulated Learning in a blended classroom
2. The learner’s Self-Regulated Learning skills influence Online Learning Satisfaction
3. Collaborative Peer Learning influences Online Learning Satisfaction in a blended classroom
4. Self-Regulated Learning mediates the effect of Collaborative Peer Learning on Online Learning Satisfaction

**Self-Regulated Learning**

Zimmerman (1989) defines academic self-regulation as “the extent to which learners are meta-cognitively, motivationally, and behaviourally active in achieving their learning goals.” Highly self-regulated learners create specific learning objectives to achieve a task and use suitable techniques to attain those objectives. In 2002, he states that self-regulation is especially significant since it meets an educational goal, preferably developing lifelong learning skills.

Recent years have seen an increase in the availability of online courses as well as an increase in access to information (Littlejohn, Allison, Milligan, & Colin, 2015). The self paced and flexible nature of these courses make room for several self regulatory processes like making choices about your learning needs, time management in how one learns, planning, reflective practices and sustained motivation to go through the course (Rowe & Rafferty 2013).

However, studies have shown that in an attempt to take full responsibility and have autonomy over their learning, these learners fail to employ basic strategies (Rowe & Rafferty 2013).

Such strategies are those that would for instance allow them to recognize and make use of these environments suitably, as well as the affordances of selected and self-driven educational tools to be able to monitor and modulate their needs, and ultimately successfully fulfil their learning objectives (Lynch & Dembo, 2004; Clarebout & Elen, 2004; Mcmahon & Oliver, 2001).

This attempt at controlling and mastering one’s own learning is what can be generally known as Self Regulated Learning (Zimmerman & Schunck, 2001). Self-regulated learning hence accentuates the responsibility of the learner in stating goals and strategies, dynamically addressing the ongoing planning and undertaking of tasks, and identifying and reflecting on one’s perception and its effect in conjunction with the learning task.

Self Regulated Learning therefore goes further than depending on skill specific knowledge, but calls for self-motivation, self-awareness, and behavioural skills to effectively control that knowledge. This student-centred capability to adapt to how to respond to varied educational needs, underlines the importance of Self Regulated Learning skills in maintaining lifelong learning and knowledge economy needs of learners (Zimmerman, 2002; Littlejohn, Allison, Milligan, & Colin, 2015). Owing to their superior motivation and adaptive learning methods, self-regulated learners do not only have a higher possibility of academic success but they also view their future very positively (Zimmerman, 2002).

With the existence of many online learning environments, come several technology affordances and possibilities which promote and support Self-Regulated Learning (Tsai, Shen & Fan, 2013; Littlejohn & Milligan, 2015). The integration of Self Regulated Learning’s promotional affordances at different levels within course designs (Harris, Lindner, & Pina, 2011), and the benefits for both researchers and learners (Panadero, Klug & Järvelä, 2016), has gotten both recognition and consensus in the field towards the potential effectiveness of aiding Self Regulated Learning development (Lang, Siemens, Wise & Gasevic, 2017).

**Collaborative Peer Learning**

Peer collaboration refers to collaboration among peers or group members who are expected to team up with each other to facilitate the optimal achievement of common goals while enabling the construction of individual knowledge in the process of collaboration (Slavin, 1991).

Assinder (1991) believes that collaborative learning makes it easier for learning tasks to be accomplished as well as develops a more participative, self-confident, responsible and motivated learner through free talk and communication.

Vygotsky also states that learning a specific task together collaboratively can achieve better results than individual learning.

There exists many ways in which collaborative peer learning can be implemented. Some include:

Peer Tutoring: Students can work in pairs or small groups, helping each other understand concepts and complete assignments

Group Projects: Students can collaborate on projects, dividing tasks and sharing responsibilities.

Think-Pair-Share: Students individually brainstorm ideas, discuss them with a partner, and share their thoughts with the larger group.

Collaborative Problem Solving: Students work together to solve problems, analyze data, and develop solutions.

Online Collaboration Platforms: Students can use online tools to collaborate on documents, share ideas, and provide feedback.

**Relationship between collaborative peer learning and Self-Regulated learning**

Bandura (1974) and others through the social cognitive theory stressed that when peers learn from others who are similar to themselves, such learning is very effective. Research has shown that learners will develop more Self Regulated Learning skills when learners with low self-efficacy beliefs learn from peers who exhibit high-level Self Regulated Learning skills. That is, self regulated learning skills can be acquired by learners during the process of peer collaborative learning. This happens because some of the aspects of peer learning give room for them to acquire self regulated learning skills. For example, collaborative peer learning gives more chances for peer-to-peer interactions in comparison to teacher-student interactions. As they ask for assistance from their peers, this helps them practice self regulatory skills like self reflection.

Collaborative peer learning also gives the learners a sense of shared responsibility. It is believed that during collaborative peer learning, the learners allocate and share the thinking responsibilities in relation to the task at hand. When thinking becomes a shared responsibility, every learner becomes an active participant and this requires them to regulate their learning using various strategies and they also try to understand the thoughts of the other peers while carrying out a task (Zimmerman, 1989).

**Online learning satisfaction**

Technology-based education has rapidly progressed over the years, with online learning becoming one of the increasingly popular approaches to providing broader access to

Education (Singh, Yusoff, and Oo, 2009). One of the major issues with online learning is ensuring that the learner is satisfied with the learning experience. Factors like the quality of the support services available, the information provided, and the technology systems can have a great impact on the learners’ satisfaction (Idkhan & Idris, 2023). The quality of support service involves features like how fast support can be received from the teacher or a support system, as well as the manner of approach of the support giver. The quality of the information provided entails the relevance of the material provided, the complexity of the material provided etc. Meanwhile, the quality of the technology system will involve features like user friendliness of the user interface, platform stability, access speed etc.

Added to these factors, there have been various theories that have attempted to explain learner satisfaction in an online learning environment. One of such is the Technology Acceptance Model propounded by Davis in 1989, which focuses on users' acceptance and adoption of technology. According to TAM, the users’ perceptions about a technology's usefulness and ease of use will affect his/her intention to make use of it.

**Blended learning**

Blended learning (also known as hybrid or mixed-mode learning) is a concept that grasps the advantages of both traditional classroom teaching and ICT supported learning including both offline learning and online learning. It incorporates direct instruction, indirect instruction, collaborative learning; constructive learning and computer assisted learning. This is learning through a combination of face-to-face instruction and online instruction ((Lalima & Dangwal, 2017). It focuses on merging together asynchronous and synchronous learning activities through technology to construct effective learning environments that helps the learner meet the specific learning goals (Garrison &Kanuka, 2004).

**Relationship between online learning satisfaction and self regulated learning**

Students’ online learning satisfaction is a pertinent variable that can be used to evaluate students’ learning outcomes in an online learning environment. It is very paramount for the students’ learning satisfaction to be evaluated because online learning entails the students to be intrinsically motivated as well as disciplined from within. Studies have shown that students that possess a high level of self regulated learning skills also reported positive online learning satisfaction (Rowe and Rafferty, 2013). In that same line, Puzziferro (2008) realised that learners with high level of self regulation skills are more satisfied with learning online. This can be due to the fact that such students can better regulate and adjust their learning in order to adapt to the online environment.

**Mediating role of self regulated learning**

The results of many studies have shown that self regulated learning serves as a mediator in many learning situations leading to diverse learning outcomes including learner’s satisfaction (Panadero, Klug & Järvelä, 2016; Barnard *et al*, 2010; Lim et al, 2020; Faza & Lestari, 2025). This study hypothesises that self regulated learning acts as a medium between collaborative peer learning and online learning satisfaction.

 (Indirect effect through Mediator)

Collaborative Peer Learning (CPL)

(IV) X

Self-Regulated Learning (SRL)

(M)

Online Learning Satisfaction (OLS) (DV) Y

B

A

Direct effect

C

**Fig 1: Theoretical Model**

**Methodology**

**Research Design:**

 This study made use of a correlation research design to examine the probability of a relationship between collaborative peer learning, self regulated learning and online learning satisfaction. To establish a theoretical model, collaborative peer learning was taken as an exogenous variable (independent) while self-Regulated learning and online learning satisfaction were endogenous variables (dependent variable) with Self-Regulated learning as the mediator variable.

**Sample and Population:**

This study was carried out in the Higher Technical Teacher’s Training College Kumba of the University of Buea. The target population is any student who is involved in courses in which the lecturers offered blended learning. HTTTC Kumba is found in one of the areas that is being affected by the Anglophone crisis in Cameroon. Thus there are periods when a face to face class is either dangerous or impossible. It is at such instances that teachers resort to blended learning. Most teachers have at one time or the other employed this hybrid method in order to save time and also resources so that the work load for that course is covered by the end of the semester.

**Sampling Procedure:** In order to reduce bias, students offering general courses are used in this study. General courses are those courses offered by almost all the students of a particular level. Two of such courses were used in the 2023/2024 academic year. One of the courses is for the final year students of the first cycle while the other course was for the final year students of the second cycle. The questionnaire was administered to all the students offering these two courses.

**Table 1: Demography of students administered copies of the questionnaire to**

|  |  |
| --- | --- |
| Department | Sample size |
|  First cycle | Second Cycle |
| Administrative techniques | 42 | 19 |
| Social Economy and Family management | 33 | 10 |
| Topography and Real Estate Management | 5 | 4 |
| Civil Engineering and Forestry Techniques | 4 | 5 |
| Computer Science | 16 | 8 |
| Tourism and Hospitality Management | 11 | 9 |
| Mechanical Engineering | 6 | 0 |
| Management Sciences | 49 | 14 |
| Law | 9 | 12 |
| Electrical Power Engineering | 4 | 2 |
| Total | 179 | 83 |
|  |  262 |  |

**Return Rate**

The questionnaire was administered to 262 students in total but only 256 copies of the questionnaire were returned giving a percentage of 97.71% return rate.

**Table 2: Demography of students who returned their questionnaire**

|  |  |
| --- | --- |
| Department | Sample size |
|  First cycle | Second Cycle |
| Administrative techniques | 42 | 18 |
| Social Economy and Family management | 33 | 10 |
| Topography and Real Estate Management | 5 | 4 |
| Civil Engineering and Forestry Techniques | 4 | 5 |
| Computer Science | 16 | 8 |
| Tourism and Hospitality Management | 11 | 9 |
| Mechanical Engineering | 6 | 0 |
| Management Sciences | 49 | 13 |
| Law | 9 | 11 |
| Electrical Power Engineering | 4 | 2 |
| Total | 175 | 81 |
|  |  256 |  |

**Instrumentation**

The items of the questionnaire consisted of closed ended questions under each of the variables. The items were gotten from literature review. The first section consisted of demographic information while the next three appertained to measuring Self-Regulated Learning, Collaborative Peer Learning and Online Learning Satisfaction.

**Data Analysis**

IBM SPSS was used to run the mediation analysis then the indirect effect was calculated using the SOBEL test. The table below is a summary table of the notation for each variable.

**Table 3: Variable notations**

|  |  |  |
| --- | --- | --- |
| **Variable Name** | **Variable Type** | **Notation** |
| Collaborative Peer Learning  | Independent variable | X |
| Online Learning Satisfaction | Dependent variable  | Y |
| Self-Regulated Learning  | Mediator variable | M |

The mediation analysis was done as follows:

**Result and Discussion:**

**Estimate the total effect between X and Y variables**

The total effect between X and Y was checked using a simple linear regression in SPSS. The output showed that p-value is ≤ 0.05 therefore the total effect is significant (0.000) as shown in the table below.

**Table 4: Total effect significance**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable  | UnstandardizedCoefficients | Standardized Coefficients | T | P |  |
|  | B | Std. Error |  Beta |  |  |  |
| CPLAvg | 1.224 | .043 | .870 | 28.150 | .000 |  |

|  |
| --- |
| 1. Dependent Variable: OLSAvg

**Table 5**: **Model Summary of the total effect between X and Y variables** |

|  |  |  |  |
| --- | --- | --- | --- |
| Model | R | R Square | Adjusted R Square |
| 1 | .870a | .757 | .756 |

a. Predictors: (Constant), CPLAvg

**Estimate the direct effect of X on M**

The direct effect of X on M was estimated to find the unstandardized beta and standard error coefficients for path A still using linear regression. The output was as follows

**Table 6: Unstandardized beta and standard error coefficients for path A**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable  | UnstandardizedCoefficients | Standardized Coefficients | T | P |  |
|  | B | Std. Error |  Beta |  |  |  |
| CPLAvg | 1.075 | .034 | .891 | 31.325 | .000 |  |

|  |
| --- |
| a. Dependent Variable: SRAvg |

**Table 7: Model Summary** **of the direct effect of X on M**

|  |  |  |  |
| --- | --- | --- | --- |
| Model | R | R Square | Adjusted R Square |
| 1 |  .891a |  .794 | .794 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| a. Predictors: (Constant), CPLAvg

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | df | F | Sig. |
| Regression | 1 | 981.240 |  .000b |
| Residual | 254 |  |  |
| Total | 255 |  |  |

 |
| a. Dependent Variable: SRAvg |
| b. Predictors: (Constant), CPLAvg |

**Estimate the direct effect of X and M on Y**

The direct effect between X and Y and M and Y was estimated to find out the unstandardized beta and standard error coefficients for paths B and C. Since there are two predictors, multiple linear regression was used here. The output was as follows

**Table 8: Unstandardized beta and standard error coefficients for paths B and C**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable  | UnstandardizedCoefficients | Standardized Coefficients | T | P |  |
|  | B | Std. Error |  Beta |  |  |  |
| CPLAvg | .091 | .053 | .065 | 1.709 | .089 |  |
| SRLAvg | 1.054 | .044 | .904 | 23.828 | .000 |  |

|  |
| --- |
| a. Dependent Variable: OLSAvg |

**Table 9: Model Summary of the direct effect of X and M on Y**

|  |  |  |  |
| --- | --- | --- | --- |
| Model | R | R Square | Adjusted R Square |
| 1 |  .962a |  .925 | .925 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| a. Predictors: (Constant), SRLAvg, CPLAvg

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | df | F | Sig. |
| Regression | 2 | 1564.262 | .000b |
| Residual | 253 |  |  |
| Total | 255 |  |  |

 |

|  |  |  |
| --- | --- | --- |
|

|  |
| --- |
| a. Dependent Variable: OLSAvg |
| 1. Predictors: (Constant), SRLAvg, CPLAvg
 |

 |

Here is a summary of the regression coefficients that have been estimated so far.

Collaborative peer learning (CPL)

(IV) X

Self-Regulated Learning (SRL)

(M)

Online Learning Satisfaction (OLS) (DV) Y

 A= 1.075 (.034) B= 1.054 (.044)

 C= .091 (.053)

**Fig 2: summary of the regression coefficients**

**Test indirect effect for statistical significance**

To test whether the indirect effect is significant, the Sobel Test is used. This is done using a Sobel Test calculator online. The Unstandardized Beta coefficients for paths A and B is input for a and b while the standard error coefficients for paths A and B is input in the fields Sa and Sb to have the following output.



**Fig 3: Sobel test for indirect effect significance**

Thus the indirect effect analysis results for X MY using Sobel Test as follows:

Test statistics = 19.09346196

Std. Error = 0.0593423

p-value = 0.00000

Since the p-value is less than 0.05, it can be concluded that the indirect effect between Collaborative Peer Learning and Online Learning Satisfaction through Self-Regulated Learning is statistically significant (p-value≤ 0.05).

The point estimate of the indirect effect at which p-value in the Sobel test is statistically significant was calculated by multiplying the Unstandardised Coefficient Beta for A by that of B like this:

1.075 \* 1.054 = 1.13305

1.13305 is the estimate of the indirect effect between Collaborative Peer Learning and Online Learning Satisfaction through Self-Regulated Learning variables.

**Reporting Mediation Analysis**

This study has examined the mediating role of self-regulated learning strategies on the relationship between collaborative peer learning and online learning satisfaction. The mediation analysis reveals that Collaborative Peer Learning significantly predicts Self-Regulated Learning (R2 =.794, F (1,254) =981.240, p< 0.001), indicating that 79.4% of the variance in Self-Regulated Learning is explained by Collaborative Peer Learning. In the combined regression model predicting Online Learning Satisfaction, both Collaborative Peer Learning and Self-Regulated Learning were included as predictors, resulting in a model that explains 92.5% of the variance in Online Learning Satisfaction (R2=.925, F(2,253)=1564.262, p <.001). The coefficients table indicates that while Collaborative Peer Learning had a positive but non-significant direct effect on Online Learning Satisfaction (B= .091, SE=.053, β=.065, t (255) =1.709, p=.089), Self-Regulated Learning has a significant positive effect (B=1.054, SE=.044, β=.904, t(255)=23.828, p <.001). Finally, the Sobel test confirmed full mediation (z=19.09, p<.001), indicating that Self-Regulated Learning fully mediates the relationship between Collaborative Peer Learning and Online Learning Satisfaction. These results suggest that the relationship between Collaborative Peer Learning and Online Learning Satisfaction is fully mediated by Self-Regulated Learning.

The results of this study corroborates the assumption that students are more satisfied in a blended course in which they learn collaboratively with their peers because they developed better Self-Regulated Learning skills. This leads to the conclusion that the effect of collaborative peer learning on online learning satisfaction was exclusively dependent on the self-regulated learning strategies the students employed. This means that students who do not employ effective self-regulated learning strategies when studying a blended course tends to have low satisfaction. These results are in line with that of other studies like Lim *et al. (2020)* who found out that self-regulated learning fully mediates the relationship between collaborative peer learning and online learning satisfaction.

**Conclusion**

It can be drawn from this study that the influence of collaborative peer learning on online learning satisfaction is because of the self-regulated learning strategies employed by the students. This brings an awareness that educators need to incorporate instructional scaffolding strategies that promote the development of self-regulation skills in the students. This will in turn improve their satisfaction in online learning. Thus teachers have to come up with more creative ways of encouraging self regulated earning so that the satisfaction of students learning online can be sustained.

**Recommendations**

Instructional Designers are encouraged from these results to incorporate aspects of self-regulated learning strategies when designing for blended learning to help students develop self-regulated learning skills. This could include breaking down the course into various units, giving them several learning and assessment options and organizing the course in a logical manner. This will promote goal setting and reflection and further give them autonomy over their own learning. Other ways in which the teacher could promote development of self regulation skills in the learner are:

Teach in a cohort model so that learners are motivated and encouraged by their peers;

Provide mechanisms for learners to track their progress.

Provide a space for the learners to display their learning goals online.

Provide constructive feedback to build the learner’s motivation etc.

This is very necessary for sustaining a student in a blended course.

**Disclaimer (Artificial intelligence)**

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing

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