E-learning in Tertiary Education in Ghana: Exploring Its Nuggets and Nuances for Stakeholder Engagement

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Abstract: Electronic teaching and learning continue to soar across all levels of education in Ghana especially following the emergence of covid-19. To this end, plethora of Colleges and Universities are interested in how to best engage e-learners as regards course content. This study explores the dynamics through which taking courses via e-learning medium utilizes student engagement, juxtaposing data from the Ministry of Education-Ghana. Data was analyzed using a series of ordinary least squares regression models, also controlling for relevant student and institutional traits. The results corroborated several significant correlations between e-learning and final years student engagement in Ghana’s tertiary institutions. Those students taking quite a number of online courses were more likely to engage in quantitative reasoning than their other counterparts. Nonetheless, they were less likely to engage in collaborative learning, student-faculty interactions, and discussions with diverse others, compared to their more traditional classroom counterparts. The students with greater numbers of online courses also indicated less exposure to effective teaching practices and lower quality of interactions. The relationship between these engagement indicators and the percentage of classes taken online suggests that an online environment might benefit certain types of engagement but may also be somewhat of a deterrent to others. Institutions should consider these findings when designing online course content and encourage faculty to contemplate ways of encouraging student engagement across a variety of delivery types. Higher learning institutions should blend e-learning with traditional learning so as to fully expose variety of learners to the merits and somewhat demerits of either modes. More importantly, as majority of students who enjoyed the lofty Free Senior High School policy await admissions in tertiary institutions, the researchers recommend that e-learning batch of students be concurrently admitted with normal classroom delivery students so as to ensure increased intake and further ensure no qualified student is left behind due to infrastructural deficit. With this, whilst students are in school for traditional face-to-face sessions, their counterparts are home for e-learning with this practice being rotated on semester basis until such a time infrastructural deficit are addressed.

Keywords: E-learning, Tertiary education, Student engagement, Assessment, Ghana.

I. INTRODUCTION

E-learning is gaining dominance in most higher learning institutions, especially after the emergence of covid-19 (Awinbugri et al., 2020). Despite its dominance, it seems it is yet to take shape and rightful place in developing countries and most hypostatically, higher learning institutions, Ghana not being an exception. E-learning or online technology (zoom, whatsapp, email, learning management systems, discussion boards, video conferences, social media, etc.) can offer efficient and convenient ways to achieve learning goals for online education students (Chen et al., 2010; Junco et al., 2010, 2013; Parsad & Lewis, 2008). As technology swiftly develops and more students pursue the online learning route for a variety of reasons, it remains imperative to further model assessment and evaluation techniques for the “virtual university” (Stallings, 2002). However, assessment of e-learning programmes should also take cognizance of the unique aspects of this type of learning environment, as “using established techniques for student success in traditional classrooms do not always work in distance courses” (Serwatka, 2002, p. 48). What is even mind boggling in most Universities and Colleges of education is the fact that, there are woefully inadequate or poorly resourced IT labs for pragmatic e-learning outcomes couple with unstable internet, lack of data, significant untrained lecturers to better appreciate the role of IT in facilitating learning outcomes (Awinbugri et al., 2020).

Online education issues and trends

It is imperative and or indispensable to explore the emerging circumstances and issues with higher education e-learning to provide a better context for dynamic ways in which the student experience might be improved. E-learning has several attributes that can have an impact on faculty implementation and course progress. Restauri et al. (2001) cite the importance of considering the logistical component of e-learning, suggesting that improperly functioning technology can hinder learning and engagement if students and instructors must devote time and resources to simple content access. Failing technological aspects of e-learning courses can be especially frustrating for students and have a negative impact on their
overall perception of the course (Pollack & Wilson, 2002), so user-friendly design and adequate technological support must be considered differently within online education.

Furthermore, Shuey (2002) indicates that it can be difficult for instructors to adapt certain activities (such as performance assessments, continuous assessment, and proctored tests) to the online format without losing content knowledge or interaction between classmates and/or instructors. Wijekumar et al. (2006) suggest that the feedback loop between teacher and student that is taken for granted in a face-to-face setting must be adapted as well, as online students may feel more isolation from their professors if traditional assessments like multiple-choice quizzes and exams are used too heavily.

The increasing rate of changes in technology often exceeds the rate of scientific research on such time-sensitive topics. The bombardment of social media within the past decade has had a tremendous impact on higher education, and more recent research indicates trends for the importance of incorporating social media into the classroom (Awinbugri et al., 2020; Evans 2014; Junco et al., 2010, 2013; Tess 2013).

Furthermore, there is rising evidence for the importance of adapting online education to mobile devices, citing that younger and full-time employed students are more likely to use mobile versions of learning management systems (Armstrong et al., 2020; Han & Shin 2016). Most studies find positive effects from use of mobile learning for online courses (as discussed in Wu et al. 2012), although this could also be due to bias against the publication of studies with non-significant findings (Whitley, 2002).

Another facet in the evaluation of e-learning programmeme is that e-learning education students often have different background characteristics in terms of gender, age, academic discipline, and prior education, which contributes not only to their preference for an online course format but also to their success in any academic discipline (Richardson et al., 1999). Investigations of differences between online and face-to-face course formats also need to explore whether differences in outcomes should be attributed to the online medium itself or to differences in student-level characteristics (Wojciechowski & Palmer, 2005). Some research suggests that certain types of students, including younger, male, and Black students, may be at a disadvantage in their ability to adapt to online courses (Xu & Smith Jaggars, 2013).

Furthermore, students may need additional motivation, organization, and self-discipline to be successful in their online learning endeavors (Jacob & Radhai, 2016). E-learning education has the grit and temerity to reach a wider audience, in a sense leveling the playing field for students usually at a disadvantage in access to education; however, the unique needs and situations of these students can greatly impact their educational experiences and institutions should take care not to exacerbate existing gaps.

Against this backdrop, despite the potential issues with implementation and learning outcomes, e-learning continues to soar. A recent survey of 4550 Colleges of Education students in Ghana, specifically Ashanti-Brong Ahafo unraveled an unparalleled 37% indicating their preference of e-learning to normal classroom delivery. Even though that was a positive response rate, juxtaposing it to the overall study population of 10466 still shows that, more is yet to be done so that e-learning can take its rightful place in Ghana even after covid-19 pandemic (Awinbugri et al., 2020). In addition to courses taught entirely online, blended learning (i.e., instruction that combines face-to-face with online elements) has become increasingly popular not only at the course level (Drysdale et al., 2013) but also at the student level, as many students are taking a mix of online only and face-to-face courses as part of their college experience (Allen and Seaman 2013). Nearly a decade ago, research from Kim and Bonk (2006) predicted some of these trends in the rise of learning management systems and blended learning, but further noted the importance of planning and moderating skills for faculty teaching online courses and that faculty generally want training and support from their institutions to improve their online teaching abilities.

While numerous researchers have explored the impact of the widespread adaptation of digital technologies on students’ educational attainment and learning outcomes (Braten & Stromso, 2006; Kuh & Hu 2001; Robinson & Hullinger, 2008; Zhou & Zhang, 2008), relatively little is known about how these alternate learning experiences and practices impact overall student engagement, as a majority of the original research on student engagement was centered on students in traditional face-to-face settings. Newer research that does explore the effects of technology-mediated learning on student engagement and outcomes generally focuses solely on findings at the individual course level (Drysdale et al., 2013; Henrie et al., 2015), not the overall student experience, so it can be difficult to generalize these findings.

A few studies have suggested that technology can have positive effects on student engagement (Chen et al. 2010; Henrie et al. 2015; Hu and Kuh 2001; Junco et al. 2013; Nelson Laird et al. 2005; Robinson & Hullinger 2008) and time spent in co-curricular activities (Junco 2012). For example, one study showed that using asynchronous technology tools promoted reflection, which leads to higher-order thinking (Robinson & Hullinger, 2008). Others found that online courses increase the need for students to work collaboratively (Thurmond & Wambach, 2004), and that more interactivity and engagement with online discussion boards are related to higher course performance (Kent et al., 2016).

In the light of these earlier findings, the current study purses the engagement of students who access their learning content through e-learning medium at varying levels exploring patterns of engagement for e-learners and those in face-to-face settings through the percentage of classes in which a student is enrolled online in Ghana’s tertiary institutions, specifically
some universities and colleges of education. Accordingly, to what extent are the nuggets of e-learning platforms in harnessing student’s engagement in Universities and Colleges of Education in Ghana?

II. METHODOLOGY

Participants

The Ministry of Education in Ghana within this covid-19 period continued to provide data on various means of engaging students in tertiary institutions in Ghana, especially final year students in Colleges of Education and selected universities such as University of Cape Coast. Regular updates of the Ministry of Education through the Ministry of Information saw much of the terminology on the survey was adapted or developed with the goal of being inclusive of both online and traditional learning environments. For instance, the words “in the classroom” were changed to “in your courses” to avoid the reference to a physical space. This study uses 2020 NAB and MOE data from over 350,637 students in Ghana’s tertiary education sector (https://wenr.wes.org/2020/04/education-in-ghana). First-year students made up 42.6% of the respondents, while the remaining 57.4% were seniors. The sample was 45.0% males and 55.0% females, with 88.5% reporting full-time enrollment status. In addition, the sample included 145,000 students (41.0%) taking all their courses completely online and 205,637 students (59.0%) taking none of their courses online. The average institutional response rate was 29% (SD = .116).

Measures

Students can be classified into online, traditional, or mixed format students using two NAB items. The first research tool asks students to report the number of courses they are taking in the current term, and then a follow-up item asks how many of those courses are undertaken via e-learning. Using these two items, a “percentage of courses online” variable was created by dividing the number of online courses by the number of total courses respondent reported taking 4 courses, 3 of which were entirely online, he/she would be 75% online. This continuous variable was the independent variable of interest in the study.

The dependent variables were ten scales, which NAB regards as “Engagement Indicators,” that were used to measure the engagement levels of students. These scales included higher-order learning (4 items; Cronbach’s a = .84 first-year, .85 senior), reflective and integrative learning (7 items; Cronbach’s a = .87 final-year, .89), quantitative reasoning (3 items; Cronbach’s a = .85 final-year, .85 senior), learning strategies (3 items; Cronbach’s a = .77 final-year, .78 senior), collaborative learning (4 items; Cronbach’s a = .80 final-year, .80 senior), discussions with diverse others (4 items; Cronbach’s a = .89 final-year, .90 senior), student-faculty interactions (4 items; Cronbach’s a = .82 final-year, .84 senior), effective teaching practices (4 items; Cronbach’s a = .85 final-year, .89 senior), quality of interactions (5 items; Cronbach’s a = .84 final-year, .83 senior), and supportive environment (8 items; Cronbach’s a = .89 final-year, .89 senior).

These scales show acceptable levels of internal consistency (McMillan & Schumacher 2001) and previous research suggests sufficient evidence for construct validity with exploratory and confirmatory factor analyses (Miller et al., 2016). Each scale was scored on a 60-point scale by converting the response sets to 60-point intervals and then averaging the rescaled items. As a Consequence, a score of zero would mean a student responded at the bottom of the response set for every item in the scale, while a score of 60 would mean that a student responded at the top of the response set for every item in the scale. Thus, higher scores on the scales mean higher levels of that particular aspect of engagement. The survey instrument also collected demographic information from respondents, including gender, transfer status, enrollment status, parents’ education, age, major, race/ethnicity, and grades.

Analyses

Ordinary Least Squares (OLS) regression analyses were deemed suitable due to the ordinal nature of the dependent variables and the appropriateness of this method for testing theory with real-world data collected outside of manipulated laboratory settings (Field 2009; Tabachnick & Fidell, 2001). A series of 10 step-wise OLS regression analyses (one per each engagement indicator) were conducted for both first-year and senior students. In each of the analyses, the percentage of online courses was entered as the last step predictor variable by itself. Selected student and institutional characteristics were entered as step one of the model, as previous research (Pascarella & Terenzini, 2005) suggests that there are differences in student engagement and educational experiences for students based on these characteristics. The student-level characteristics included were gender, transfer status, enrollment status, first generation status, age, quizzes/exam score, major race/ethnicity, and grades

III. RESULTS

The results of the regression models comprising all final-year students indicate that the proportion of online classes being taken has a statistically significant, negative effect on 3 of the 10 engagement indicators. More specifically, final-year students who take more classes online report lower levels of collaborative learning in their courses, fewer diverse discussions with others, and lower quality of interactions. On the other hand, the proportion of online courses taken by a final-year student had a positive effect on the amount of time spent engaging in quantitative reasoning activities. More online courses were related to more engagement. This suggests that while there appear to be some disadvantages to online learning as regards engagement for final-year students, there are benefits too.
Further findings on some students showed that the percentage of online courses was a statistically significant negative predictor for 5 of the 10 engagement indicators. Students’ ratings of effective teaching practices, student-faculty interaction, discussions with diverse others, quality of interactions, and collaborative learning were lower when they were taking more online courses. The strongest correlation found was between the percentage of online courses taken and collaborative learning, indicating that the greater the percentage of online courses a student is undertaking, the lower the amount of collaborative learning in which he/she is engaged. This was matched by the relationship between student-faculty interaction and percentage of courses online for selected students, again with traditional face-to-face students having the advantage in this manner of engagement.

Specific statistically significant beta weights for all models are indicated in Table 1. In addition, the variance explained for each model is contained in Table 1. The predictor variables accounted for 1.7–10.0% of the total variance on the engagement indicators (final-year M = .0315, SD = .0102; senior M = .0498, SD = .0287). Even though this may not seem like a very large proportion, the relatively low percentage of explained variance is quite likely due to the fact that the models are very simple focusing on just the percentage of online courses taken and controlling for student and institutional characteristics.

IV. DISCUSSION

The significant correlation for engagement and amount of online course exposure unraveled that the e-learning platform might urge certain caliber of engagements, such as more use of quantitative reasoning activities. In sharp contrast, traditional classroom environments appear quite likely to ameliorate collaborative learning, student-faculty staff socialization, effective teaching practices, quality of interactions, and discussions with diverse others. The findings from this study focusing on engagement in the e-learning jurisdictions draws inspiration on the past literature in this area and show potential need for even more exploration and exposition.

Table 1 Selected results from the OLS regression models: explained variance (R²) and the effects of the percentage of e-learning courses on the ten engagement indicators

<table>
<thead>
<tr>
<th>Engagement indicator</th>
<th>Final-year R²</th>
<th>Final-year b</th>
<th>Senior R²</th>
<th>Senior b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher-rated learning</td>
<td>.032***</td>
<td>NA</td>
<td>.015***</td>
<td>NA</td>
</tr>
<tr>
<td>Reflective teaching&amp; learning</td>
<td>.031***</td>
<td>NA</td>
<td>.073***</td>
<td>NA</td>
</tr>
<tr>
<td>Learning techniques</td>
<td>.035***</td>
<td>NA</td>
<td>.047***</td>
<td>NA</td>
</tr>
<tr>
<td>Quantitative logic</td>
<td>.051***</td>
<td>.014***</td>
<td>.100***</td>
<td>NA</td>
</tr>
<tr>
<td>Collaborative tutelage</td>
<td>.036***</td>
<td>-.025***</td>
<td>.080***</td>
<td>.087**   *</td>
</tr>
<tr>
<td>Social interaction with diverse others</td>
<td>.016***</td>
<td>-.011**</td>
<td>.021***</td>
<td>-.015**</td>
</tr>
</tbody>
</table>

|                      | .042***       | NA           | .084***   | .047**   |
| Effective teaching practices   | .035***       | NA           | .026***   | .022**   *|
| Quality of interactions       | .037***       | -.019***     | .027***   | -.012**  |
| Supportive academic environment | .023***     | NA           | .027***   | NA       |

**p \ .005 (Bonferroni cutoff); ***p \ .001

Controlling for student characteristics: gender, transfer status, enrollment status, first generation status, age, quizzes/exams, major (arts and humanities as reference group), race/ethnicity (White as reference group), grades (mostly A’s as reference group) and institutional characteristics: control (private/public), size.

Source: Statistical package for service solutions (SPSS,22.0)

Final-year students taking more classes via e-learning reported gargantuan levels of quantitative reasoning and logic. This could be attributed to the nature of core courses most likely to be adapted to the online environment. Certain academic facets that are higher in use of quantitative reasoning skills, like business, trainee teachers and nursing, are quite commonly offered in the e-learning style (Friedman 2014). Many course management systems, such as University of education, Winneba (UEW) LMS, are geared specifically at STEM fields with e-learning video functions, programming to accommodate special characters and formulas, and interactive guided problem-solving. These systems are also designed to facilitate the online format simpler for faculty with automatic grading functions and pre-recorded videos. It seems most instructors enjoyed e-learning assessments as marking was pretty simpler and timely.

E-learning environments also appeared to be less conducive to student-faculty interaction for students as most students simply joined with their phones to register their presence in the lecture without much concentration. Although some instructors might feel that e-learning environments necessitate tremendous, rather than less, interaction with students because research suggests that e-learning courses require more time from faculty such as time for login, waiting time for students to join, waiting time for reconnections (Allen & Seaman, 2013; Tomei, 2006), it may be that the interaction is more superficial in this type of context. It takes greater time to type multiple email responses to student questions, which may come at any time of the day, than it does to make a single in-class announcement. Free version of zoom lectures last just about 40 minutes meaning that lectures cannot often go as scheduled. Answering trivial questions can take instructor time away from sharing course content and developing course activities; thus, interaction may suffer from a student perspective.

Interestingly, there may be ways to combat some of these reserved and detached online interactions with faculty and

| Student-faculty staff socialization | .042***       | NA           | .084***   | .047**   |
| Effective teaching practices       | .035***       | NA           | .026***   | .022**   *|
| Quality of interactions            | .037***       | -.019***     | .027***   | -.012**  |
| Supportive academic environment    | .023***       | NA           | .027***   | NA       |
replace them with more amiable means of communication. More informal assessments of student learning can take place during chat-room discussions, examination of problem-solving logs, and discussion board content analysis to enhance formative feedback for students while providing a sense of enhanced faculty interaction (Wijekumar et al., 2006). Pukkaaew (2013) found that while online students did not care for the communication platforms in the institution-provided course system, they had greater course success when using social media (Facebook) for chat and messaging with instructors and tutors instead. The formality of institution-provided email and learning management systems may be hindering student perceptions of faculty interaction. In general, interactions for students and faculty are less common for first-year students; perhaps the reduced interaction for all first-year students masks the online effect. The quality of interactions with other institutional representatives follows this pattern as well, but for both first year and senior students.

Similar to the findings for student-faculty interaction and quality of interactions, students with more online exposure seemed to rate their faculty members’ effective teaching practices lower as most instructors appear less professional in e-learning platforms (Awinnbugri et al., 2020). Perhaps faculty members that are teaching courses online need to spend more time contemplating the logistical components of incorporating technology and adapting their courses for the online environment so as to ameliorate higher engagement rate among participants (Restauri et al., 2001)

V. CONCLUSION

The time is ripe and now for e-learning to take its shape and rightful place in Ghana’s higher educational/degree awarding institutions. Whilst it appears a new form of experience for many a learner, it seems to also come with severe sacrifices in the form of fully furnished IT labs, data, stable connectivity and above all, training of human capital to man the various e-learning platforms.

It is gainsaying that these findings open the floodgates for further inquiry. Further research might look at particular online tools and techniques, both general and discipline-specific, which lead to these different types of engagement and learning so as to ameliorate education for e-learners. Future studies might integrate concepts such as motivation (Pintrich, 2004) and achievement goal orientation (Murayama & Elliot, 2009), also known to play pivotal role in student engagement but not specifically measured by NAB, and apply previous findings to the setting of online learning. This study used a multi-institutional sample, but it may be useful to conduct some in-depth explorations of a few schools that have made progressive advances in online education such as University of Ghana (UG), Kwwame Nkrumah University of Science and Technology (KNUST), APWCE etc profiling their processes and outcomes to develop an applied model for practice.

As technological devices used in e-learning continues to soar and evolve rapidly, research must persistently address the impact of online learning in higher education in Ghana, especially degree awarding institutions. It might be useful to replicate the current study with a slight reframing of the research question, comparing subgroups of students who take 100% of their courses online, hitherto referred in Ghana as (IdEL) to those who are take all of their courses in normal classroom settings and exploring whether the predictive power augments. More research is also required on whether there are disciplinary variations between academic majors and the use of online curriculum, and if these patterns are similar to those for face-to-face learning settings. More importantly as majority of students who enjoyed the lofty Free Senior High School policy await admissions in tertiary institutions, the researchers posit that e-learning batch of students be concurrently admitted with normal classroom delivery so as to ensure increased intake and further ensure no qualified student is left behind due to lack of students. With this, whilst students are in school for traditional face-to-face sessions, their counterparts are home for e-learning with this practice being rotated on semester basis until such a time infrastructural deficit are addressed.

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