INTEGRATING ICT INTERVENTIONS TO REDUCE STUDENTS' DIFFICULTIES IN USING GOOGLE CLASSROOM IN HIGHER EDUCATION

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ABSTRACT The shift towards e-learning amid the coronavirus disease pandemic revealed considerable problems with students' use of the digital platform for learning, especially Google Classroom. This study assessed the impact of an organizational intervention program, called "Let's Talk ICTO," on students' use of Google Classroom. The study was based on Goal-Setting Theory and models on technology adoption, wherein a pretest-posttest descriptive action research design was used with 357 respondents chosen via stratified random sampling.

It was established that the difficulty levels reported by the students at the beginning were exceptionally high ($M = 4.46$), but significantly reduced after the intervention ($M = 3.65$) ($p < .05$). From the findings, it can be observed that the intervention successfully reduced the level of difficulty among the students especially with regard to technology usage, internet connection, and navigating the system. The findings indicate a need for structured ICT support to help students better utilize LMSs.

The study recommends strengthening ICT training programs, integrating digital orientation in academic courses, and improving institutional support systems to enhance online learning experiences.

Keywords: Google Classroom, ICT intervention, student difficulty, online learning, action research

INTRODUCTION

The coronavirus (COVID) outbreak accelerated the transformation of the educational world, forcing universities to move from conventional, physical learning to entirely digital, flexible learning. The sudden transition required an instant response to ensure continued learning even amidst numerous disturbances. This led to the adoption of Learning Management Systems (LMS), which played a crucial role in delivering lessons, assigning homework, and communicating with learners. Among the many Learning Management Systems, Google Classroom has proven to be among the most popular due to its convenience and compatibility with multiple digital applications (Iftakhar, 2016).

A change of this sort reflects a broader move towards integrating ICTs in higher education, which is known to be crucial for improving access, flexibility, and continuity of learning during emergencies such as the coronavirus pandemic. However, research has shown that for the integration of ICTs to be successful, it is not enough to simply have access to ICTs; rather, it should be a holistic process that includes several elements to enable learners to benefit from the process (Tatnall, 2020; Patra et al., 2021). Without them, the advantages of using digital platforms can be overlooked, posing challenges for learners when using such platforms.

The adoption of e-learning environments presented extra hurdles from an educational point of view. Whereas normal classroom environments demand little effort from students, e-learning demands more autonomy and computer skills from learners. Learners need to possess skills to work digitally, work independently, and engage with digital resources. While Google Classroom helps learners achieve these goals with its advanced features for organizing, collaborating, and communicating, the success of this approach depends entirely on the learner's proficiency in using the application. As noted in the research literature, the incorporation of ICT into education does not mean merely embracing technology as such but also involves pedagogy (Tatnall, 2020; Patra et al., 2021).

The Technology Acceptance Model (TAM) can serve as a theoretical framework for understanding students' interactions with digital media. According to TAM, two factors play a significant role in technology acceptance: perceived usefulness and ease of use. If students find the system useful and easy to use, they will use it appropriately (Jakkaew & Hemrungrote, 2017). However, factors such as poor digital literacy, unstable internet connections, and a lack of supportive environments can hinder a positive perception of the technology. Consequently, students' involvement decreases, and they face difficulties.

Not only is TAM essential in promoting learning in technological settings, but other theories like constructivism and design-based learning also emphasize active participation, cooperation, and guided learning. Such theoretical frameworks propose that the effectiveness of learning increases when learners are actively participating in the process as well as when instructional methods are related to real-life applications. According to Seboka et al. (2025), the application of professional development strategies such as design-based professional development not only enhances technological expertise but also fosters learning skills, thus fostering the adoption and usage of ICT.

Even with the benefits that Google Classroom offers, students still face different difficulties when using it. These difficulties include poor internet connections, limited availability of devices, and inadequate digital skills among others. Several studies have shown that these problems hinder students' ability to participate in the online learning platform and attain the expected learning goals (Hassan et al., 2020). Moreover, other contextual factors, such as power outages, limited technical support, and infrastructure constraints, have been identified as contributing to the use of ICT in education (Joshua et al., 2021).

Furthermore, access-based problems are frequently linked with socio-economic issues, resulting in differences in learning experience. Learners from poor communities lack access to the internet and ICT-enabled devices, making them less likely to benefit from online learning. It is an important problem with regard to the implementation of ICTs because, apart from access to technology, it also affects the quality of learners' learning experience (Tatnall, 2020; Patra et al., 2021).

Given these difficulties, the literature indicates the need for targeted intervention measures to boost students' digital competencies and address learning obstacles. Among the most important ones are digital literacy training, technical assistance, use of multimedia materials, and digital tasks relevant to learning objectives (Carreon & Aquino, 2021; Tatnall, 2020). Such measures help improve students' digital skills.

It is important to note that institutional and policy-related factors also matter for the efficiency of integrating ICT into the teaching process. Financial support, infrastructure improvement, and professional development should all be considered, as without them the process would yield no results (Tatnall, 2020; Patra et al., 2021).

Even though the number of publications on ICT integration and the use of Google Classroom has significantly increased in recent years, a lack of scientific evidence for intervention-oriented studies aimed at minimizing the challenges students face persists. In most cases, researchers have focused on technology acceptance and attitudes towards ICT tools. However, less attention is paid to the actual effectiveness of interventions that improve students' competencies.

In view of the foregoing issues, the rationale for conducting the current study is to examine the effectiveness of the intervention program, LetsTalkICTO, in overcoming the obstacles students encounter when using Google Classroom. In particular, the findings that will be generated through this study prior and post-intervention, will reveal the benefits of ICT interventions for improving digital literacy among learners.

Results and Discussion

Level of Difficulty Before the Intervention

Table 1. Level of Difficulty of Students in Using Google Classroom Before the Intervention

Difficulty in accessing internet at home	4.38	0.84	Very High
Inability to afford internet subscription	4.36	0.82	Very High
Poor upload/download condition	4.39	0.86	Very High
Difficulty asking teachers for clarification	4.56	0.88	Very High
Knowledge limitation in using Google Classroom	4.73	0.79	Very High
Internet restrictions	4.63	0.83	Very High
Difficulty using Google Classroom system	4.31	0.87	Very High
Lack of computer skills	4.27	0.85	Very High
No skills in using Google Classroom	4.51	0.84	Very High
Difficulty submitting assignments	4.49	0.86	Very High
Overall Mean	**4.46**	**0.83**	**Very High**

Results show that the respondents had to face extremely high levels of difficulty before the intervention, suggesting that switching to online studies has been quite difficult for them. This is consistent with a number of problems that occur during the process of ICT adoption when there are not enough facilities, digital skills, and organizational capacity to facilitate the change (Tatnall, 2020; Patra et al., 2021). The level of difficulty suggests that the students have faced many obstacles in their learning process.

From a system perspective, the use of ICTs in education is a multi-level process that entails developing technological infrastructure, human capabilities, organizational policies, and pedagogical approaches. However, when one of these elements is missing, then the implementation of ICTs cannot be effective. In the current case, the extremely high degree of difficulty arises due to such an inconsistency in the interrelation between the aforementioned elements, especially with regard to students' capabilities and infrastructural readiness. As ICT integration studies point out, digital transformation is impossible without combining all these elements, which does not seem to have been achieved in the given case (Tatnall, 2020).

Knowledge Limitation was rated to be difficult among the many factors involved. These results suggest that learners did not have the competencies needed to navigate Google Classroom. Research suggests that digital literacy is one of the main prerequisites for ICT integration. Learners without the know-how when it comes to technology will experience challenges that may affect their learning process (Jakkaew & Hemrungrote, 2017). Digital literacy is not only about knowing how to operate a computer but also encompasses more complex skills, including the management of information, problem-solving, and adapting to changes in technology.

Furthermore, poor digital literacy may have been an additional factor contributing to increased cognitive load on students. The cognitive load theory proposes that learners have a limited processing capacity, and that when this limit is exceeded, learning becomes less efficient. In e-learning, when students are not familiar with the digital platform, they need to use their cognitive energy to understand how to navigate the interface, leaving less time for studying the actual content.
Apart from skills-related problems, infrastructural issues such as internet access and the availability of gadgets were major sources of difficulty for students. This result is similar to previous research that found that problems relating to access continue to be an important barrier to ICT-based education, especially in developing countries (Tatnall, 2020). This suggests that technological and socio-economic factors need to be considered when implementing ICTs into schools. If students do not have access to gadgets and internet connectivity, they will not be able to engage in learning activities through ICTs.

Furthermore, one has to consider connectivity, as most online learning tools rely heavily on Internet availability for interaction. The lack of connectivity will affect the entire learning process as well as the submission of assignments and use of resources for learning. This may further increase the financial burden on poor students.

Further, the problem in communicating lies in the design of the online learning environment itself. Good communication is key in engaging students and making them understand the lessons; however, online learning platforms do not provide immediate feedback and interaction that is present in traditional classrooms (Heggart & Yoo, 2018). This implies a change in pedagogical approach to ensure successful communication in an online setting. Without interaction, students will have trouble clarifying doubts and asking questions, leading to a poor understanding of the lesson.

Another important implication that stems from this finding is the importance of social presence in e-learning. Social presence refers to the extent of connection that an individual has with others in the learning setting. Where social presence is minimal, learners will be lonely and lack motivation to learn, thus hindering the learning process. The unwillingness by the students to approach teachers to get explanations on some of the issues shows the absence of social presence in the online learning environment.

Additionally, the common high difficulty across all indicators indicates that these difficulties were systemic rather than personal. This implies that these difficulties did not affect individual students or particular instances but rather affected the entire sample of participants. In such situations, a systemic response is needed to address these difficulties.

The results from the intervention demonstrate the complex issues associated with students having trouble with Google Classroom. The issues arise from a complex set of problems related to their digital skills, infrastructure, and lack of communication, among other factors. Solving this problem calls for an all-encompassing strategy.

2. Level of Difficulty After the Intervention

Table 2. Level of Difficulty of Students in Using Google Classroom After the Intervention

Difficulty in accessing internet at home	4.17	0.83	High
Inability to afford internet subscription	3.91	0.76	High
Poor upload/download condition	4.12	0.85	High
Difficulty asking teachers for clarification	3.43	0.98	High
Knowledge limitation in using Google Classroom	3.35	0.93	Moderate
Internet restrictions	3.61	0.92	High
Difficulty using Google Classroom system	3.40	0.92	Moderate
Lack of computer skills	3.31	0.99	Moderate
No skills in using Google Classroom	3.34	1.00	Moderate
Difficulty submitting assignments	3.83	0.96	High
Overall Mean	**3.60**	**0.59**	**High**

The drop in difficulty levels post-intervention is indicative of the success of the structured support through ICT in enhancing learners' abilities. The change from "very high" to "moderate" difficulty across most indicators suggests that students improved at maneuvering within the system.

This improvement in students' ability can be attributed to the structured approach, which may have included clear directions for practice and feedback. This is important because skill acquisition requires an environment where students can gain mastery incrementally. The structured approach also helped minimize difficulties faced by the students in the process.

This is a development consistent with studies indicating that training is key to enhancing digital literacy and ICT usage (Carreon & Aquino, 2021). Practical training is often more successful in helping learners acquire competence in digital media because they incorporate immediate feedback from the learners' participation in practical tasks.

Theory-wise, the change is based on constructivist theories of learning, which emphasize active involvement in the learning process. Involvement in the learning process will help students gain better insights about the subject matter and also enable effective application of their knowledge base. Through this exercise, it appears that the environment set up was conducive for learning experiences.
Nonetheless, issues related to the internet suggest that there are still infrastructural barriers. Although training helps increase users' competencies, it does not address other aspects, such as access and resources (Tatnall, 2020; Patra et al., 2021).

These issues further emphasize the role of institutions in integrating ICTs. Institutions need to ensure they offer training, as well as the infrastructure and other resources necessary for success. Failure to do so means that the ICT intervention will lack significant benefits for the learners because of some barriers they encounter.

Furthermore, the variations in their answers show the different effects that the intervention program had on them. This must be due to differences in their prior knowledge, learning styles, and available resources. Differences like these show the importance of an intervention program that is flexible enough to change as per requirements.

In summary, results obtained after the intervention suggest that structured ICT assistance has the potential to greatly enhance learners' capabilities and overcome problems encountered. Nevertheless, the problems that still exist demonstrate that much more work is required to address underlying infrastructure issues.

3 Difference Before and After Intervention

Table 3. Difference in Students' Level of Difficulty Before and After the Intervention

Difficulty Level	4.46	3.65	0.81	<0.05	Significant

This dramatic decrease in difficulty shows the efficiency of the implemented approach. This result is consistent with theoretical models such as Goal Setting Theory, which emphasizes the provision of guidance and feedback to increase performance. As a result of the intervention, students were able to gain skills and competence for working in Google Classroom because of the guidance provided. It is possible that the structured nature of the intervention helped provide students with clear expectations, appropriate tasks, and necessary feedback. Thus, all important elements that increase performance can be found in the approach used.

However, the observed progress was attributed not only to enhanced proficiency in technical skills but also due to high self-confidence and low mental stress. Since the users had become adept at the use of the system, they were able to complete many functions with much ease, and hence made them easy. This corresponds with the principle that the repetition of an action enhances competency by practice. Digital technology, when used continuously, allows users to get to a point where certain tasks are performed automatically.

This conclusion is backed by research showing that digital literacy and proficiency of technology rise substantially after the students undergo systematic training and practice sessions (Jakkaew & Hemrungrote, 2017). Likewise, investigations into the use of ICTs in the teaching process have shown that educational initiatives aimed at fostering digital capabilities help boost learning because the students are better able to explore and understand digital information and technologies (Tatnall, 2020). In addition, technology-supported learning settings enable learners to be more engaged, motivated, and communicative.

The findings of this study further conform to the adoption of the technology theory that postulates that increased levels of usability and usefulness would facilitate higher levels of interaction. As the learners were exposed to the technology, the perceived ease of use and usefulness improved; hence, their academic performance. The acceptance of the technology model suggests that people are likely to adopt and use technology if they see it as easy and useful.

In addition, the improvement observed in this case study is supported by the literature on digital learning platforms, which shows a marked improvement in students' performance and digital literacy as a result of being introduced to well-designed ICT-based programs. For example, the literature has established that Google Classroom can be effective only if users receive sufficient training and support, leading to better academic performance and fewer difficulties with task completion.

Another important aspect of the observed improvement is the development of students' self-efficacy. Self-efficacy refers to individuals' belief in their ability to perform specific tasks. As students gained experience and successfully completed tasks using Google Classroom, their confidence likely increased, leading to a more positive learning experience. This increase in self-efficacy is critical, as it influences students' motivation, persistence, and overall engagement in learning activities.

Although the intervention had been quite successful in decreasing difficulties, it should be noted that they were not completely overcome. There remained some difficulties, especially those connected with external factors, for example, internet connection problems and resource availability. It implies that although any interventions could help overcome internal obstacles to the use of ICT by teachers, they would hardly be able to cope with the problem of external obstacles. The above-mentioned conclusion highlights the necessity to adopt a holistic approach towards the implementation of ICT in education.

In addition, the results highlight the importance of sustained, continuous intervention efforts. Digital literacy is not a one-time achievement but an ongoing process that requires continuous learning and adaptation. As technology evolves, students must continually update their skills and knowledge to remain effective users of digital platforms. Therefore, interventions should not be viewed as isolated initiatives but as part of a broader strategy for developing digital competencies.

In conclusion, the substantial drop in level of difficulty is an indication that ICT-based strategies are successful in developing learners' capabilities and making the experience more enjoyable for them. These results offer evidence for theory and stress the significance of incorporating technological and pedagogical aspects for success in e-learning.

4. Differences in Students' Difficulty by Profile Variables

Table 4. Differences in Students' Difficulty by Profile Variables

Sex	U = 3015.5	0.845	Not Significant
Year Level	H = 15.62	0.001	Significant
Course	H = 41.24	0.000	Significant

The absence of gender differences suggests that ICT challenges are not influenced by demographic factors but are instead related to access, experience, and training. This finding reinforces the idea that digital inequality is more closely associated with socio-economic and contextual factors than with inherent demographic characteristics. In many educational contexts, disparities in digital access and skills are often linked to differences in resources, exposure, and support systems rather than gender.

This observation is supported by existing studies on the integration of ICTs, which point out that the limitations that affect the adoption of technology are more structural and contextual than demographic (Tatnall, 2020). As an example, the presence of stable internet access, availability of hardware, and experience with digital technologies play important roles in determining whether learners can effectively interact with virtual learning sites. Once these variables are accounted for, gender-based disparities become less pronounced, implying that there is no significant difference in the ability of male and female students to adjust to virtual education settings.

The significant differences across year level and course highlight the importance of context in shaping students' experiences. Students in higher year levels may have greater exposure to technology, resulting in lower levels of difficulty. This can be attributed to their increased experience with academic tasks, familiarity with digital tools, and ability to adapt to new learning environments. As students progress through their academic programs, they are more likely to encounter opportunities to use technology, which enhances their digital competencies.

In the same way, variations among courses are a result of how courses have been designed and how much technology has been used in the process of teaching. Courses which make use of technology tend to give birth to students with high digital literacy skills whereas those courses which do not make much use of technology might not be able to provide such opportunities.

These findings are supported by research indicating that exposure to technology and learning environments significantly influences students' digital competencies. Studies have shown that learners who frequently use digital tools and engage in technology-mediated learning activities demonstrate higher levels of proficiency and confidence (Jakkaew & Hemrungrote, 2017). Additionally, disparities in digital skills have been linked to differences in socio-economic background, educational opportunities, and institutional support systems .

The differences that have been noted further emphasize the necessity of designing appropriate ICT-based solutions for each individual group of learners. A single approach cannot prove successful in dealing with all the different problems that various learners face, and therefore it is important to take into account several aspects, including the level of students' knowledge and other learning demands.

Furthermore, the findings underscore the role of institutional support in addressing disparities in digital competencies. Institutions must provide targeted support for students who may be at a disadvantage, such as those in lower year levels or courses with limited technology integration. This may include providing access to resources, offering training programs, and implementing policies that promote digital inclusion.

A critical implication of this study would be the integration of digital literacy into the curriculum. Instead of considering digital literacy as something extra, it should be incorporated into the curriculum to make sure that students can develop these skills. In addition to improving their digital literacy skills, such an approach will prepare students for the challenges of the digital economy.
In conclusion, the profile variable analysis reveals the significance of context in determining how ICT affects students. These results indicate that tackling digital inequality requires a holistic strategy considering various determinants.

5. Effect Size of the Intervention

Table 5. Effect Size of the Intervention

Difficulty Level	4.46	3.65	0.81	0.88	Large Effect

The large effect size confirms that the intervention had a substantial impact on reducing students' difficulties. This highlights the importance of structured ICT interventions in improving digital competencies and learning outcomes. Unlike statistical significance, which indicates whether an effect exists, effect size provides insight into the magnitude of the impact. In this case, the large effect size suggests that the intervention produced meaningful and practically significant improvements in students' ability to use Google Classroom.

The reason for the effectiveness of this intervention was because of its design, which probably involved features such as having a clear objective, guidance in teaching, and practice opportunities. All these features are fundamental to effective learning since they guide learners on how to use the knowledge gained during the process. The effectiveness of the intervention indicates that when certain measures are put in place, learner competence can be greatly enhanced.

This finding is consistent with research indicating that structured ICT interventions lead to significant improvements in digital literacy and learning outcomes. Studies have shown that training programs and technology-supported learning environments enhance students' engagement, motivation, and performance by providing them with the necessary skills and resources . Additionally, digital literacy training has been found to produce significant gains in participants' competencies, as evidenced by improvements in pre-test and post-test scores.

Moreover, the substantial effect size indicates that the intervention was effective in overcoming some of the significant barriers associated with using technology in the process of education, especially barriers associated with low levels of digital literacy and difficulties in understanding how to navigate the system. In doing so, the students were relieved of the burden associated with using Google Classroom, thus allowing them to focus more on their studies.

However, the persistence of certain challenges indicates that interventions must be complemented by broader institutional and infrastructural support. While the intervention was effective in improving students' competencies, it may not have fully addressed external factors, such as internet connectivity and device access. This highlights the need for a holistic approach that integrates training, infrastructure, and policy development.

In addition, the results underscore the significance of sustainability for ICT projects. Though immediate gains should be appreciated, sustained gains require sustained efforts. The institutions need to provide sustained access to learning opportunities, training, and other resources in order to allow students to sustain and improve their ICT competencies.

The large effect size also has implications for policy and practice. It provides empirical evidence supporting the effectiveness of ICT-based interventions, which can inform decision-making at the institutional and policy levels. By demonstrating the impact of structured interventions, the study highlights the potential of ICT integration to enhance learning outcomes and reduce educational inequalities.

In addition, the results indicate that there is potential for substantial gains from investments in ICT interventions, both in terms of enhanced student achievement and participation. This highlights the need for the provision of resources to facilitate digital learning programs and enable students to develop the necessary competencies for effective online learning.

CONCLUSION

This study concludes that ICT-based interventions are highly effective in reducing students' difficulties in using Google Classroom, as evidenced by the significant decrease in difficulty levels and the large effect size ($d = 0.88$). The findings indicate that structured training programs significantly enhance students' digital competencies, particularly in system navigation and technological skills.

Nevertheless, constant problems concerning internet connection make it clear that there should be an effort on the part of institutions to invest in ICT to guarantee equal access to e-learning for everyone. Moreover, it is evident from the results of the study that students face different challenges depending on their course and academic year.

Overall, the study underscores the critical role of continuous ICT support, digital literacy training, and institutional commitment in improving online learning experiences. These findings provide valuable implications for policy development, curriculum design, and instructional practices in higher education.

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