

The Effect of Google Classroom-Assisted Learning on the Academic Achievement of Students

Noornadiyah Md. Sari^{a,b}, Khoo Yin Yin^a, Zainizam Zakariya^a

^aFaculty of Management and Economics, Sultan Idris University of Education, Malaysia,

^bSMK Datuk Bendahara, Melaka

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Abstract

The use of technology applications in education is undoubtedly quintessential nowadays. Therefore, the government has launched the *Jalinan Digital Negara* (JENDELA) (2020-2022) plan by concentrating on learning at home as one of the main plans. Besides, the Ministry of Education Malaysia has also introduced a virtual learning platform called Google Classroom or Digital Educational Learning Initiative Malaysia (DELIMa) at the school level. Nonetheless, the prevalence of economic teaching and learning approaches still depends on conventional learning. The existing approach contradicts constructivist learning and the necessities of the current generation Z, which concentrates on self-directed learning. This research intended to test the effect of Google Classroom-assisted learning on the achievement of economics students. This quasi-experimental study employed pre- and post-achievement tests to collect data on 207 Form Six economics students through random cluster sampling. After collecting and coded data, descriptive analysis and ANCOVA inference were performed. The results reported that the experimental group of students exposed to the collaborative approach (GCDK) and those not exposed to the collaborative approach (GCTK and KPK) differed insignificantly. To gather more extensive data, it is recommended that the prospective researchers interview a larger sample of studies in institutions that offer economics courses at the matriculation and diploma levels. This study drives educators to revise past teaching methods and be open-minded to accept current settings by acknowledging the resources and readiness of existing students in tackling the digital learning environment as the new norm today.

Keywords: Digital Education, Economics Education, Experimental Study, Google Classroom, Student Achievement.

Introduction

Digital education transformation is the process of redefining education via the use of digital technology to enhance learning possibilities and prepare students for a world where technology is used more and more (Bilyalova et al., 2020; Oliveira & de Souza, 2022). This change means having teachers and students develop their digital skills in addition to using the Internet and online learning platforms for educational objectives. The goals of the digital transformation of education are to improve learning opportunities, equip students for the demands of the increasingly digital workplace, and strengthen the cognitive, social, and emotional capabilities needed in the twenty-first century (McCarthy et al., 2023). Furthermore, the aforementioned change aims to ensure that education can keep pace with technological breakthroughs and the evolving needs of society, all the while promoting more innovative, cooperative, and personalized learning approaches (Haleem et al., 2020).

In the modern age, taking advantage of computer apps in the classroom is essential. According to Ministry of Education Malaysia (2013), this is consistent with the seventh shift of the Education Development Plan 2013–2025, which leverages ICT to raise the standard of education in Malaysia. The Department of Statistics Malaysia (2021) reported that, as a result of the demand for e-learning, a significant increase in the use of computers (3.5%), mobile phones (0.5%), and the internet (6%), as compared to 2017. In response to the growing need for virtual learning in today's society, the government has established the *Jalinan Digital Negara* (JENDELA) (2020–2022) plan, with a focus on home learning as one of the key objectives (Malaysian Communications and Multimedia Commission, 2020a). The government encourages teachers to acquire sufficient resources through various initiatives. One of these is the Malaysia Family Device Package, which enables free updates for specific 4G VoLTE mobile devices to all Malaysians. Additionally, a program called the Malaysian Family Youth Package helps students and teenagers (21 years and below) get an internet connection so they may study online and become more productive. Through these initiatives, students will have access to a hybrid learning environment and a high-quality internet broadband network. In response, the educational rehabilitation plan is moving toward the endemic phase.

Therefore, the Digital Educational Learning Initiative Malaysia (DELIMa) using Google Classroom, was established at the school level by the Ministry of Education Malaysia. The Google Classroom app provides features including timetable management, online and offline chat, file sharing, assignment creation and management, and effective feedback, which encourage interaction and collaboration (Widiyatmoko, 2021). This is made possible by the fact that educational materials may be accessible on devices like laptops and smartphones by using the Google Classroom app (Dash, 2019). This benefit gives students the ability to access educational materials whenever and wherever they want (Jamiludin et al., 2021). As of November 2021, Malaysia had the second-highest number of Google Classroom users among 64 countries (Google Trend, 2021). Positive student approval of Google Classroom utilization was also revealed by local sources (Izwan Nizal et al., 2019; Mokhtar & Karim, 2021; Syed Ahmad et al., 2020; Tuan Sarifah Aini et al., 2020). The findings demonstrated that the use of the Google Classroom application is well-accepted by educators in Malaysia.

Literature Review

Previous studies have demonstrated the beneficial effects of Google Classroom use on educators, learners, and educational institutions. Additionally, preliminary research indicates that both teachers and students can effortlessly access and use Google Classroom (Brand Fonseca & Soto Peralta, 2019; Dash, 2019). Instructors do not need to physically be present in class to assign assignments and update learning materials. Its application can also improve student-teacher collaboration and communication. Students are encouraged to participate actively and can exchange ideas more effectively. Through the internet, this application feature can be accessible. Consequently, instruction and learning can take place without being restricted by physical location. The benefit of learning accessibility is that it gives students the freedom to plan their study sessions around their schedules. This is due to Google Classroom's integration with Google Drive, which facilitates the sharing and saving of documents as well as the discovery of educational resources. Teachers can therefore swiftly prepare their students by using online educational resources. Additionally, Google Classroom is valuably helpful during crises such as pandemics. This is because the majority of institutions held their classes online during the pandemic. One of the greatest substitute learning platforms for traditional learning in continuing education is the Google Classroom app (Mohd Tahir et al., 2022; Murugesan & Santhirasekaran, 2021). It has also been demonstrated by earlier research that educators have been using Google Classroom to provide students with instructional materials. This application has the benefit of offering a discussion forum platform, online feedback, and a communication channel to encourage students to engage, interact, and collaborate.

Furthermore, this approach is in line with the generation Z students' lifestyle, who are highly exposed to technology. Al-Emran (2019) maintained that students and academics who own a smartphone are more likely to use a mobile learning approach than students who do not have such devices. Nonetheless, the effectiveness of this medium on student achievement was inconsistent. The experimental study by Haggag (2019); Fauzan and Fatkhul (2019); Ramadhani et al (2019) found that the treatment group using Google Classroom outperformed the control group in terms of achievement growth. However, Huang et al. (2021) unveiled a contradictory conclusion that the treatment and control groups showed no difference in achievement. Based on the social learning theory of constructivism (Vygotsky, 1978), new knowledge is created through social interaction. Throughout collaborative learning, students gain knowledge from a variety of viewpoints, get input from their peers, and evaluate concepts until they come to a final understanding (Stacey, 1999). Collaborative learning, which is a student-centered active learning technique that encourages student involvement, is extremely pertinent. Additionally, the availability of internet connections and communication tools makes it convenient for students to communicate with one another. Marburger (2005); Ramlee et al (2020) also proposed that active learning methods be executed in economics teaching because such methods encourage active student involvement and enhance performance.

Nevertheless, economic teaching and learning approaches still rely on conventional learning such as lectures (Aziyana & Andin, 2018; Beckers & Watts, 2001; Calimeris, 2018; Ford & Leclerc, 2000; Onger, 2017). Jalani and Sern (2015) asserted that the approach is only relevant to the principles and theories. Such teacher-centered and one-way methods make the learning environment unattractive, unappealing, and monotonous (Wan et al., 2017; Xu,

2014). The current approach runs counter to the needs of the current Generation Z, who prioritize self-directed learning approaches, and constructivist learning viewpoints. Therefore, the purpose of this study is to determine how Form Six economics students' academic performance is impacted by using Google Classroom to support their learning. Hence, we formulated the following hypotheses: Ho: there is no difference in the effect of using learning methods assisted by the Google Classroom learning management system with a collaborative approach (GCDK), learning methods assisted by the Google Classroom learning management system without a collaborative approach (GCTK), and conventional learning methods (KPK) on the achievement of form six economics students.

Research Methodology

Three schools in the Malaysian state of Malacca took part in this quasi-experimental investigation. The participants were the form six economics students who were selected at random from the cluster. Each student group was presented with different teaching strategies. including (a) the collaborative learning approach (GCDK) with Google Classroom support (63 people); (b) the Google Classroom support without collaborative learning approach (GCTK) (63 people); and (c) the traditional learning approach (KPK) (81 people). Pre- and post-economic achievement tests were used. According to Davison et al. (2015), information can be obtained from a group of experts via the Criterion-Related Evidence technique, to gather data to determine the appropriate instruments. To validate the instrument, the researcher has selected five experts with varying specialties and degrees of expertise, in accordance with Polit et al (2007); Lynn (1986), who recommended a minimum of three or more experts. The I-CVI value of the economic achievement test in this study was 0.97. Stewart and Haswell (2013) define an appropriate I-CVI value as 0.80 or higher, while Polit and Beck (2006) state that a value of 0.90 indicates excellent validity. The achievement test is based on actual past Malaysian Higher School Certificate questions. The achievement test contained 30 multiple-choice objective questions. Because the test questions' Cronbach's alpha score was 0.80, they satisfied the reliability criteria. According to McMillan and Schumacker (1984), a decent indicator of instrument reliability is an alpha value between 0.70 and 0.90. As a result, this research instrument had a high degree of reliability and was appropriate for use in real studies. Figure 1 shows the quasi-experimental flow chart of the study conducted.

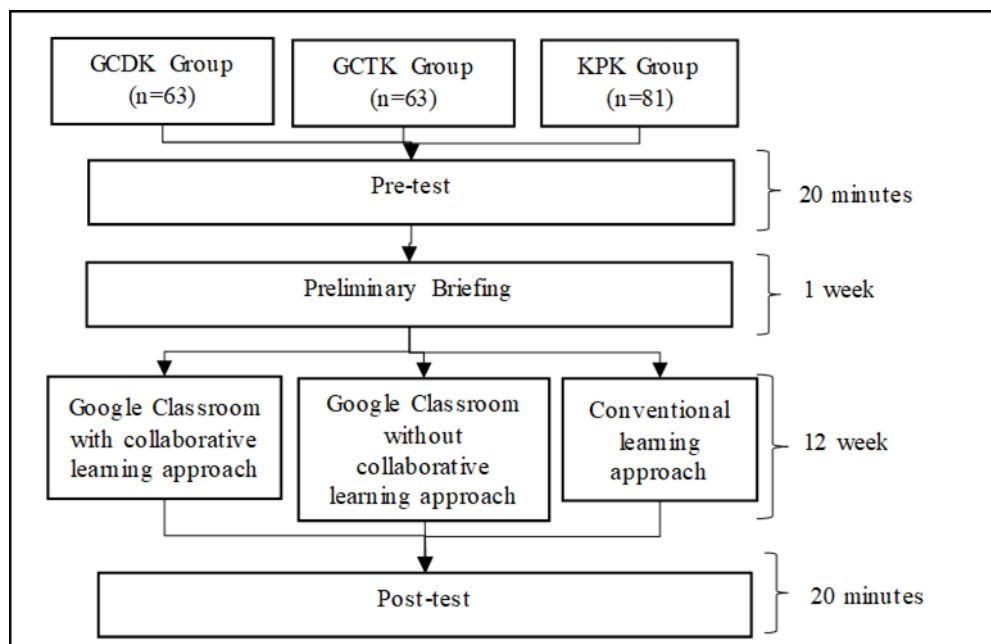


Figure 1: Quasi-experimental study flow chart

Prior to the intervention, pre-administered tests were carried out for roughly 20 minutes. Study participants received training and preparatory briefings one week in advance. For 12 weeks, every student received and utilized identical economics study materials. GCDK group students were divided into several small groups consisting of four to six people using Google Classroom learning with a collaborative learning approach. GCTK group students followed Google Classroom-assisted economics learning without a collaborative learning approach, and the KPK group attended learning from existing teachers. At the end of the 12th week, post-tests were administered to gather information after students were exposed to treatment. Pre-test and post-test data were analysed using descriptive analysis and inferential analysis (ANCOVA) to measure differences in achievement based on the learning approach conducted on each group.

Results

Table 1 summarises the distribution of the study participants' demographic profiles. According to gender, the majority were female students, which was 146 respondents (70.5 percent) compared to 61 male student respondents (29.5 percent). According to the demographic distribution based on the number of mobile devices possessed, out of 140 respondents, the majority (67.6%) owned one to two devices, followed by 38 (18.4%) with three to four devices, 29 students (14.0%) with more than four devices, and no student was reported to be without a personal device. Furthermore, the breakdown of respondents based on how long they had been using the device revealed that 102 respondents (49.3%) had more than seven years of experience, followed by 90 respondents (43.5%) with four to seven years of experience and 15 respondents (7.2%) with less than three years. Based on the frequency of internet use per day, the demographic distribution revealed that 98 students (47.3%) were the most frequent users, spending seven to twelve hours a day online. These students were followed by 73 students (35.3%), who used the internet for one to six hours a day, and 36 students (17.4%) who used the internet for more than twelve hours a day.

Table 1

Distribution of respondents' demographic profiles

Items	Characteristics	Frequency	Percentage
Gender	Female	146	70.5
	Male	61	29.5
Number of Devices	None	0	0
	1 to 2	140	67.6
	3 to 4	38	18.4
	More than 4	29	14.0
Usage Experience	Less than 3 years	15	7.2
	4 to 7 years	90	43.5
	More than 7 years	102	49.3
Daily Internet Use	1 to 6 hours	73	35.3
	7 to 12 hours	98	47.3
	More than 12 hours	36	17.4

Achievement test analysis using ANCOVA was applied to compare post-experimental scores based on the learning approach tested by controlling for extraneous variables (pre-achievement test) as a covariate. The ANCOVA results test are reported in Table 2 which revealed no significant difference in post-student achievement based on learning approaches (GCDK, GCTK, and KPK) with a value of $F = 1.455$, $sig. = 0.236$ ($p > 0.05$).

Table 2

ANCOVA Test Results on Student Achievement

Variables		df	F	Sig.
Student achievement	Students' achievement	1	92.018	0.000
	Learning approach	2	1.455	0.236

Sig. at the .05 level

Nonetheless, when the mean achievement scores according to the learning strategy were compared in Table 3, the treatment groups for GCDK and GCTK had higher mean achievement scores than the KPK control group. This led to the conclusion that there was little achievement difference.

Table 3

Post-Achievement Mean Score Based on GCDK, GCTK, and KPK Learning Approaches

Learning Approach	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
GCDK Treatment	50.702 ^a	1.913	46.929	54.475
GCTK Treatment	51.690 ^a	1.911	47.922	55.457
KPK control	47.596 ^a	1.685	44.273	50.920

a. Covariates appearing in the model were evaluated at the following values: Pre-achievement = 11.6280.

Discussion

This study endeavored to determine how student achievement variables were affected by interventions that were based on the different learning approaches. The study employed ANCOVA analysis to ascertain the potential impact of the interventions on the dependent variables. Based on the tested learning strategy, the researcher's analysis revealed no significant difference ($p > 0.05$) in student accomplishment.

The study's results supported past comparisons of the impacts of learning management system-assisted learning, which did not discover any appreciable distinctions between the experimental group and the traditional method (Adams & Dove, 2017; Al-Qahtani & Higgins, 2012; Bulut Ozek, 2018; Cantabella et al., 2019; Davis & Frederick, 2020; Jazayeri & Li, 2020; Vercellotti, 2017; Yorganci, 2020). Three schools made up the modest sample size of study participants in this investigation. Furthermore, the intervention's brief duration just 12 weeks was another drawback. If the intervention was prolonged and the number of respondents exceeded that of this particular study, the research's findings might be improved. Law et al. (2020); Vo et al (2020) claim that advanced achievement gives weaker students an advantage by having them study information at the basic level (Almasseri & AlHojailan, 2019). However, learning knowledge in economics has a larger cognitive load and requires higher-order thinking than other course content (Davis, 2015; Davis & Frederick, 2020; Hultberg & Calonge, 2017; Ping, 2003). This isn't the case with economics education. Therefore, there were no discernible changes across the research treatments based on the learning methodologies employed.

The argument put up was that the online learning strategy provides a novel technique for delivering instruction. Because of the Movement Control Order, which forces students to study from home, Google Classroom is receiving attention. Teachers and students have limited time in the short term to learn media, technology, and visual literacy (Rapanta et al., 2020). They also need to provide hardware and reliable internet connections (Arshad et al., 2020; Biney, 2019; Ismail et al., 2020; Ndlovu & Mostert, 2017). Students must set aside a specific amount of time and effort to do excessive online assignments (Motz et al., 2021). Students in this position experience stress and anxiety as they adjust to new standards in the learning environment (Bervell & Umar, 2018; Goksu et al., 2021). Accordingly, students' depressing feelings most definitely contribute to an untrustworthy learning environment, which in turn impairs students' cognitive growth and performance (Heissel et al., 2017; Nassr et al., 2020).

Previous studies have confirmed that students upload and download resources through learning management systems and take part in discussion boards (Hu et al., 2019; Mpungose

& Khoza, 2020). However, there was no discernible difference in the amount of time students spent utilizing the application, the number of documents uploaded and downloaded, or the frequency of logging in relation to their learning outcomes (Hwang, 2020; Mwalumbwe & Mtebe, 2017; Tawalbeh, 2020). This circumstance most likely arises from students' poor self-learning (Hughes et al., 2018). According to Yilmaz and Karaoglan Yilmaz (2020), students are not always encouraged to use self-directed learning practices while they are learning online. Bernard et al. (2009) added that the direct effect of student-content interaction on achievement is less than that of student interaction and teacher-student interaction. This established that social interaction during the learning process is more meaningful than the materials enclosed in the application. Economic accomplishment does not significantly improve, even if instructors can provide students with a variety of additional economic materials.

In the context of online learning, student engagement increases student accomplishment, as previous research has indicated (Kim & Kim, 2021; Soffer & Cohen, 2019). Students' social and cognitive development is subsequently influenced by their interaction with one another while they solve problems (Andel et al., 2020; Jowsey et al., 2020; Martin & Bolliger, 2018; Shukor et al., 2014). Nevertheless, the number of students participating at any one moment affects the quality of the learning. According to Afify (2019), having a small or medium-sized class size is preferable to having a large one. In the context of collaborative learning, a group of "squatter" students is not likely to help produce new experiences and connections (Le et al., 2017; Paterson & Prideaux, 2020; Razali et al., 2013). As a result, only a small number of students can take part in the conversation. Consequently, this claim validated the study's conclusions, which showed that there was no variation in economic achievement across GCDK, GCTK, and KPK learning methodologies.

Additionally, Dontre (2020); Attia et al (2017) found that student use of mobile devices increases learning distractions. Instead of producing new information, students consume technology resources (Howell et al., 2020). There is a connection between how students use smartphones and how their behavior develops. Students typically use technology for communication, entertainment, and social networking (Alshammari, 2020; Malaysian Communications and Multimedia Commission, 2020b; Schindler et al., 2017). Most consumers spend about five to eight hours a day surfing the internet (Malaysian Communications and Multimedia Commission, 2020b). This has resulted in less time allocated for learning objectives. Students' incapability to concentrate, in turn, affects student achievement (Shakoor et al., 2021). In the meantime, the majority of students, if given the choice, do not wish to continue learning online, according to statistics by Chung et al. (2020). Moreover, the learning management system's utilization during instruction is hindered by the facility constraint. A few areas of weakness in the Google Classroom online learning implementation were internet disruption, the feedback period, expert recommendations, and support from specific parties. (Hussein et al., 2020; Lee, 2021; Sangster et al., 2020; Tarteer et al., 2021). Using Google Classroom has different effects depending on the kind of educational institution and how it is used. For instance, early childhood education necessitates guardians' constant monitoring. Conversely, learning in the technical and scientific domains necessitates training in practical skills and functional testing in a laboratory setting, utilizing a distinct learning approach.

Despite the lack of a significant difference in achievement, the GCDK group's learning technique reported a higher mean value than that of the GCTK and KPK groups. This indicated that, consistent with earlier research, active learning strategies outperformed traditional learning strategies (Alsadoon, 2020; Chan et al., 2020; Mozahem, 2020; Chen et al., 2018; Lento, 2016; Olelewe & Agomuo, 2016). These results provided empirical evidence that the active learning strategy might strengthen the areas where traditional economic learning methods were lacking.

Conclusion

Since students are accustomed to in-person instruction at schools, the online learning environment presents an unfamiliar environment for them. Students must therefore have some time to adjust to this new environment. Based on the learning methodologies studied, the study's findings typically showed no changes in students' accomplishments. Teachers must innovate the way they educate in order to meet present requirements. This study enhances the quality of learning content delivery through collaborative learning on digital platforms. This study has also examined the collaborative learning philosophy by having groups use electronic media to facilitate learning. Still, specific stakeholders, such as school administrators and economics professors in particular, must support this endeavor in order for it to be successful. Teachers should adapt their previous teaching strategies and be receptive to new ideas. However, the adjustments made must consider the available resources and the level of preparation of the student. This is due to the fact that Generation Z was raised in a technologically advanced environment compared to that of the preceding generation. This study's drawback was that it solely used achievement exams with Form Six economics students. Prospective researchers should use a larger sample of studies at matriculation and pre-university institutions that provide economics courses to gather more thorough information. Ergo, to ensure the continuation of education and the protection of students' rights to an education, the researcher advised that Google Classroom be used going forward.

The research in this study contributes to the existing learning theory. Vygotsky's theory of collaborative learning promotes interaction between individuals to actively build knowledge (Ghavifekr, 2020). The collaborative learning approach was identified as active learning in economics, but the results of this study found no significant differences in academic achievement. Based on the results obtained, there is a possibility that there are variables of moderator or mediator acting, such as communication skills, digital competence, and information literacy. The variable in question not studied in this study resulted in the results of this study. The study contributes to the context of the study of economics students applying online learning approaches. According to NoorAileen et al (2015), Malaysian students are among the "spoon-fed" students. So in future studies, the researchers suggest that a comparative study of learning effects based on situations also be carried out: face-to-face and non-face. In addition, differences in achievement between individuals based on group studies were identified. For further information, a qualitative interview study is being conducted to obtain further information about past experiences of students that interfere with online collaborative learning.

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