Original Research Paper

The Role of Emerging Technologies of Students' Academic Achievement at Politchnic Seberang Perai

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Abstract: Education is crucial for global progress and is always changing due to the impact of current technologies. Ongoing discussions focus on how developing technologies are affecting teaching and learning approaches. This essay examines how incorporating new technology in education impacts academic success. Although technology is deemed essential for information dissemination in education, the influence of new technology on academic success is still uncertain. This research examines the elevated failure rates at Seberang Perai Polytechnic (PSP) in Malaysia, linking them to factors including insufficient information, slow progress in studies, and inadequate time management. The study seeks to investigate the influence of new technologies on academic achievement at PSP. The study uses an ex post facto research strategy and quantitative approaches to gather data from 200 respondents at PSP. The study aims to identify the new technologies used by students in various departments and evaluate how these technologies affect academic achievement. Chi-Square analysis and Spearman correlation coefficient are used to test hypotheses. The survey shows that modern technology is widely accessible, with cellphones being the most favoured among pupils. Noticeable discrepancies in technological access across departments have been discovered. Weak connections exist between technology usage frequency and academic achievement, with just one statistically meaningful association discovered in obtaining material on the internet. The research helps fill the void in literature on the use of new technologies for academic objectives within the context of PSP. The results underscore the need of teaching students about efficient technology utilisation to improve academic results. The study highlights that the presence of new technologies does not automatically lead to academic progress. Academic improvement relies on how students incorporate these resources into their learning methods. Suggestions involve teaching students how to use technology effectively and understanding that academic success is not guaranteed solely by using technology.

Keywords: Academic Achievement, Education, Emerging Technologies, Technology Integration.

1. Introduction

Technology is critical for delivering information to students during the teaching and learning processes. The purpose of incorporating emerging technology into the learning process is to assist students enhance their academic performance by utilizing existing technologies. There is evidence that using emerging technology boosts achievement and self-efficacy [1]. However, no consistent findings concerning the types and combinations of development technologies that lead to high academic accomplishment have been obtained. Some students in higher education appear to be adamant about using technology for learning because it is required in online programs. They may, however, confront a variety of difficulties.

Similar issues confront students at Seberang Perai Polytechnic (PSP). According to the Department of Information and Communication Technology at Seberang Perai Polytechnic, 25 students failed the first semester and 30 students failed the second semester out of 150 who sat the two-semester exam for the 2019/2020 academic year. Similar results were observed in the academic years 2020/2021 and 2021/2022.

Many people believe that the high failure rate is due to a lack of information, sluggishness in studies, and poor time management. In general, there is a scarcity of studies in Malaysia on the use of emerging technology for academic work. Given this issue, the research seeks to ascertain the impact of emerging technology on academic accomplishment at the Polytechnic Seberang Perai (PSP).

The study's objectives are as follows:
1. Identifying the differences in the sorts of new technologies used by students across departments in Polytechnic Seberang Perai (PSP) for academic work.
2. Assessing the impact of emerging technologies on students' academic performance at Polytechnic Seberang Perai (PSP).

Hypothesis
At significance level 0.05, the following hypothesis is tested:
H01: In the Seberang Perai Polytechnic (PSP), there is no statistically significant difference between existing new technologies across departments and their use for academic work.
H02: There was no statistically significant link between the frequency with which students employed new technologies and their academic achievement at Seberang Perai Polytechnic (PSP)

This study will contribute to filling a gap in the literature on the use of new technologies for academic objectives in the setting of Polytechnic Seberang Perai (PSP). There appears to be little literature on the application of developing technologies in these two polytechnics. As a result, the research reveals new and developing technologies that have evolved and been employed in academia for many years. Furthermore, polytechnic instructors may find the concept useful because it raises awareness of the usage of technology to support teaching. As it establishes a link between the two criteria, this study gives students the confidence to employ development technology for academic work.

2. Literature Review

Education is frequently seen as the cornerstone to global development. There is no disputing that education is always evolving. It brings a lot of technology that students can use to help them study. Prasad [2] discusses the influence of modern technology.

Almost all developed countries are feeling the consequences of technology. Emerging technologies are affecting every element of people's life in developing countries, according to a growing agreement. Human innovative ways of doing things, as well as educational ideals, are always evolving. As a result, teaching and learning methods have developed over time. According to Mapotse [3], global developments in science and technology have occurred.

Historically, most teachers were limited by a lack of resources or technology, forcing them to use a teacher-centered approach (chalk and talk). As a result, lecturers typically conduct the majority of the speaking, while students observe and passively listen to the offered content [4]. According to Ottevanger et al. [4], this type of education is characterized by extensive note copying and minimal practical assignments. As a result, students are more concerned with taking notes than with learning. Teacher-centered approaches are frequently chastised for failing to produce high-achieving students in

science and science subjects [5]. If the teacher-centered strategy is consistently pursued, it may signal that a better way to teach kids exists.

The introduction of computers and other technological instruments into the educational arena is frequently cited as an example of new technologies arising. In general, the entry of computers and other Information and Communication Technology (ICT) devices into the education sector will have little impact on the teaching and learning processes.

What should be considered is if the introduction of new technologies has improved students' knowledge of their subjects. Even developing technologies, according to Granito and Chernobilsky [6], are gradually being integrated into the field of education.

In the education industry, the true impacts of using technology in the teaching process are largely unknown. Teaching professionals are still perplexed about the role of technology in achieving desired student learning outcomes.

Figure 1 depicts how perplexing factors influence the process of teaching and learning that leads to academic accomplishment. The conceptual framework defines intervention variables that can help or harm academic attainment.
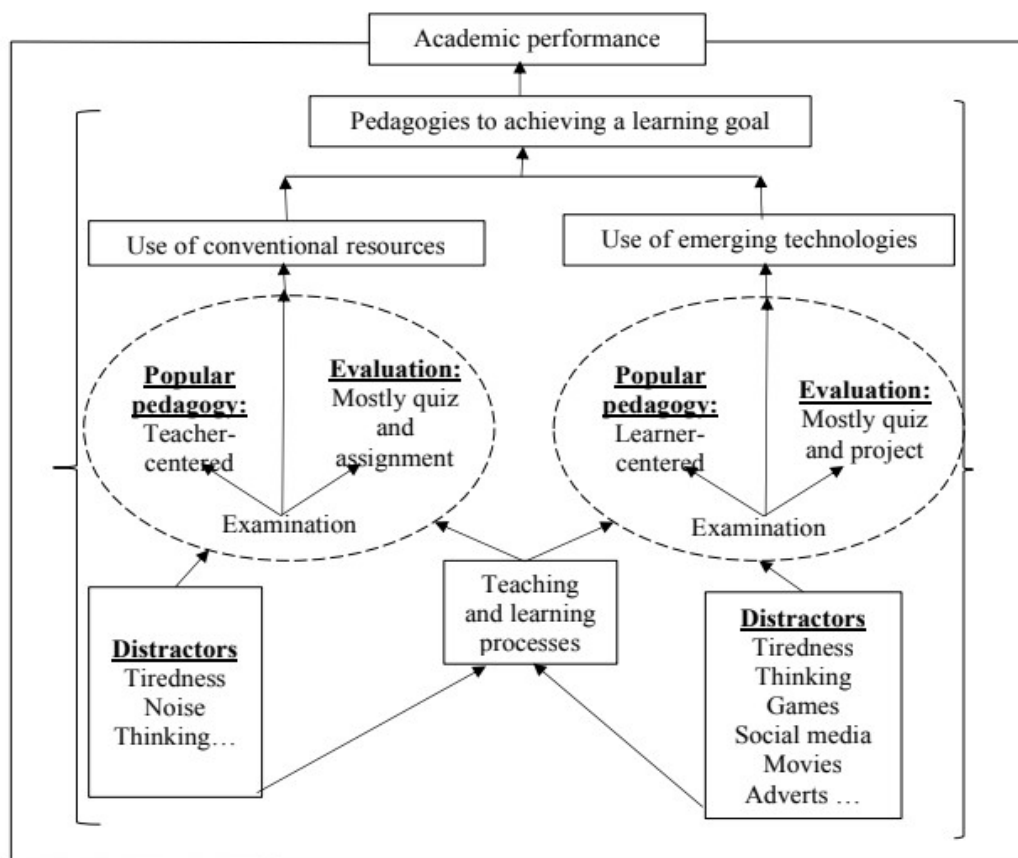

Figure 1. Conceptual Framework

Figure 1's main purpose is to uncover the characteristics that influence the teaching and learning process. These factors are known as "disruptions" because they obstruct learning activities. The researchers looked into teaching methods and compared traditional learning styles to changing student learning styles. This approach is intended to help people understand how learning environments influence pedagogical choices. To achieve educational goals, pedagogy can be either traditional (teacher-centered) or student-centered (using emerging technology). That is, the researchers look at traditional methods of achieving educational goals, such as a teacher-centered approach with an

emphasis on quizzes, assignments, and exams as the primary way of evaluation. Because the majority of these evaluation methods are tailored to each individual student, this is considered individual-based.

On the other side, by developing technology, educational goals are accomplished through a student-centered or constructivist approach, with quizzes, projects, and exams serving as the primary evaluation approaches. The majority of these decisions are comparable in some sense, and this process is not static but rather relative. As a result, they can differ depending on the context in which they work.

In terms of external elements that divert student learning, study researchers believe that disruptions are more prevalent in the use of developing technologies than traditional teaching techniques. As a result, when students want to learn, they have little interference in the traditional learning environment. On the other hand, when students incorporate modern technologies into their studies, there are additional distractions. Regardless of the disruption, the study researchers wanted to discover what kind of developing technology students use and how it affects student learning.

3. Methodology

Ex post facto research design guided the study. This design, according to Silva [7], is a type of research design in which the inquiry begins after the fact and occurs without interference from the researcher. It starts with the observation and evaluation of natural events, in the sense that the researcher cannot intervene but can only explore the causes of the evidence selected for examination. The adoption of an ex post facto approach is critical for this study since the impact of increasing technology on students' academic achievement appears to be gaining traction in the literature. What is lacking and must be researched is the type and combination of developing technologies that influence students' academic growth.

The quantitative approach was utilized to collect data from 200 respondents, with a response rate of 90.3%. These pupils were chosen using the population-representation-based stratified and cross-sectional sampling strategies suggested by Krejcie and Morgan [8]. Furthermore, validity and reliability are established using a pilot study, which provides a reliability value of 0.79 out of 50 students at Polytechnic Seberang Perai (PSP).

However, varied responses are also employed for data analysis to produce percentages and frequencies for the availability of new technology to students. The chi-square analysis tool is used for research hypotheses 1 and the Spearman correlation coefficient () is utilized for research hypotheses 2. This analytical tool is used to assess the assumption of satisfied normalcy. Sig. The normality test result of 0.137 > 0.05 indicates that the assumption of normality is met.

4. Finding and Discussion

The availability of new technologies is evident at all levels.

Table 1. New Emerging Technologies (N = 357) are Offered in The Department

Item	N	Percent of Cases
Mobile phone (smartphone)	335	93.8%
The Internet	317	88.8%
Laptops and desktops	310	86.8%
Projector	293	82.1%
Electronic books	243	68.1%
Tablet (Android, iPad)	222	62.2%
Free online course/learning platform	180	50.4%
IPA	73	20.4%
Cloud computing	73	20.4%
Projectors and laptops	42	11.8%
e-learning laboratory equipment	25	7.0%
Calculator	16	4.5%

To evaluate study hypotheses, information about the availability of developing technologies in education is used. This data is derived from Section B of the research questionnaire. Table 1 lists the technology accessible in each department.

At first look, it is clear that some technology instruments are more valuable than others. According to Table 1, mobile phones (smartphones) are the most popular among students, with 335 (93.8%) of 357 respondents reporting this. The Internet, which can be accessed via phone, laptop, and desktop, as well as projectors, is said to be readily available at 317 (88.8%), 310 (86.8%), and 293 (82.1%), respectively. Electronic books (e-books), tablets, and free online learning courses/platforms were also reported as available at 243 (68.1%), 222 (62.2%), and 180 (50.4%). More over half of those polled mentioned this new technology as a resource.

According to other study, new technologies appear to be widely adopted in emerging countries. This is hardly surprising given that 75% of mobile device subscribers live in underdeveloped nations [9]. Furthermore, it shows that the majority of respondents use mobile phone technology to access other resources such as the Internet, e-books, online courses, and so on. This information supports AlTameemy's [10], claim that mobile phones can be used for academic purposes by utilizing educational technology and applications. Every student, in some way, requires access to information on the Internet. If this is the case, each student must register for a course, verify their results, and examine their exam schedule using a mobile phone on the student's web portal each semester.

Students have restricted their use of some modern devices. That is, less than a quarter of respondents use this technical tool. Twenty.4% of respondents used emerging technologies such as smart personal assistants (IPAs) and cloud computing. As demonstrated in Table 4, current laptops/desktops and projectors (86.8% and 82.1% of respondents, respectively) are utilized for presentations, but only to a limited level (11.8%). Furthermore, 7.0% and 4.5% of survey respondents indicated e-learning laboratory equipment and calculators, respectively.

Based on these findings, one might conclude that there are constraints in the usage of available resources for teachers and students. Only a few pupils acknowledge the availability of mobile phones, laptops/desktops, and cloud computing, despite the fact that these gadgets are widely available. In contrast to the low replies for IPA, cloud computing, and e-learning laboratory equipment, Kim and Kim [11], recorded higher (60.9%) results for the availability and utilization of cloud computing services. IPA is also seen in the K-12 school system (Son, Kim, & Park, 2021) [12]. This means that students must do a lot to increase their use of cloud computing and IPA. The availability of these gadgets varies by department.

- The First Hypothesis Test

H01: In Polytechnic Seberang Perai (PSP), there is no statistically significant difference between new technologies available throughout the department and their use for academic activities.

For research hypothesis 1, the Chi-Square analysis method is utilized, and the results demonstrate that there are substantial disparities in developing technologies used by students across departments, as shown in Table 2.

Table 2 shows Chi-Square's judgment on the availability of developing technologies within the department. The results demonstrate a difference in the availability of new technologies across departments since p 0.05. Table 2 shows statistically significant variations in the availability of developing technologies for tablets (Android, iPad), x2 (4, N = 357) = 15.209, p = 0.004; and free online learning courses/platforms, x2 (4, N = 357) = 15.209, p = 0.004. Cloud computing has an x2 (4, N = 357) = 11.400, p = 0.022; projector and laptop have an x2 (4, N = 357) = 10.267, p = 0.036; and calculator has an x2 (4, N = 357) = 26.293, p = 0.000.

The data show that emerging technologies like as tablets, free online courses, cloud computing, projectors and laptop computers, and calculators vary greatly between departments. Although there are no differences in the availability of emerging technologies named throughout the department, it should be noted that tablet computing, collaborative web, and Massive Open Online Courses (MOOCs) are expected to be emerging technologies that aid in the opening of the learning environment [13]. The Chi-Square analysis results demonstrate that the availability of new technologies varies significantly among the departments analyzed. As a result, the null hypothesis (H01) is invalid. The disparity in this new technology amongst departments can be ascribed to the fact that some departments do not completely integrate or encourage their students to adopt any new learning technologies.

Table 2. Chi-Square Values for New Technology Availability Emerge Across Departments (N=357)

	Value	df	Asymp. Sig. (2-siding)
Tablet (Android, iPad) * Job Title			
Dataran Pearson Chi	15.209	4	0.004
Odds Ratio	15.152	4	0.004
Persatuan Linear-by-Linear	3.650	1	0.056
Free online course/learning platform * Department			
Dataran Pearson Chi	14.525	4	0.006
Odds Ratio	14.668	4	0.005
Persatuan Linear-by-Linear	3.260	1	0.071
Cloud computing * Department			
Dataran Pearson Chi	11.400	4	0.022
Odds Ratio	11.757	4	0.019
Persatuan Linear-by-Linear	0.827	1	0.363
Projectors and laptops * Department			
Dataran Pearson Chi	10.267	4	0.036
Odds Ratio	9.679	4	0.046
Persatuan Linear-by-Linear	8.318	1	0.004
Calculator * Job Title			
Dataran Pearson Chi	26.293	4	0.000
Odds Ratio	26.721	4	0.000
Persatuan Linear-by-Linear	12.623	1	0.000

*$p < 0.05$

- The Second Hypothesis Test

H02: There was no statistically significant link between the frequency with which students used emerging technologies and their academic performance.

This hypothesis is tested using the Spearman Stage Correlation Coefficient (). This statistical procedure is utilized since the variables involved are compiled and continuous. Table 3 summarizes the study's findings.

Table 3 contains only weak relationships with academic performance, with only one statistically significant. The proportion of respondents that use messaging apps like WhatsApp to receive relevant academic material yields a correlation coefficient of = 0.006 and a significant value of sig. = 0.904. This shows that the two variables have a weak positive link, but the relationship is not significant enough to conclude that the two variables have a well-established relationship.

The same results are observed when students participate in class-related online group discussions, = 0.038, sig. = 0.471; reading e-books, = 0.081, sig. = 0.127; doing the assignment with the Build technology tool, = 0.067, SIG. = 0.204, and so on. Furthermore, weak negative connections about the number of variables included were discovered. Watching tutorials and videos on difficult concepts was found to be negatively associated with academic performance, = -0.044, sig. 0.405; watching educational movies and playing educational games were found to be negatively associated with academic performance, = -0.028, SIG. = 0.597; and using online cloud accounts for educational document backup was found to be negatively associated with academic performance, = -0.049, SIG. = 0.352. For the items "I use a newly emerging technological tool to access information on the internet," however, = 0.109 and sig. = 0.040 were obtained. This implies that there is a statistically significant association between the extent to which developing technologies are used to access information on the internet.

Table 3. Association Between the Use of Emerging New Technologies and Academic Performance.

Item	R	Sig. (2-tail)
I use services provided by messaging apps like WhatsApp to obtain relevant academic information	0.006	0.904
I took part in my class online group discussion	0.038	0.471
I read e-books with new technological tools emerging to get more understanding of the concept	0.081	0.127
I research, type, complete and submit my assignments and projects using emerging technology tools	0.067	0.204
I watch tutorials and videos on difficult concepts	-0.044	0.405
I use emerging technology tools to access information on the internet	0.109	0.040
New emerging technological tools allowed me to use multimedia resources while studying	0.082	0.121
I usually compare lecturer lessons with online information	0.006	0.904
I take online courses easily with the help of technology tools	0.045	0.401
I watch educational movies and play more educational games than I learned with emerging technologies	-0.028	0.597
I use an online cloud account to back up my educational documents	-0.049	0.352

This study's findings demonstrate a relatively tiny association between the amount to which variables considered effect academic performance, with only one statistically significant correlation. These data confirm Weaver's [14] conclusion that there are only a few

There is a 0.035 association relationship between computer use and student performance in mathematics, science, and reading. According to Elohor [15], (BECTA) discovered no link between increasing technical resources and either reading or mathematics. Student achievement is determined more by their commitment to study than by the resources at their disposal.

Because it only has a limited or no association with academic accomplishment, the use of new technology in learning can be considered a minor element in learning. Since BECTA revealed that the association of factors included in the preceding study was 0.07, this study discovered that the maximum relationship achieved on students' use of emerging technologies to acquire information on the internet was 0.109.

As a result, the null hypothesis that there is no statistically significant association between how frequently students utilize emerging technologies and their academic results must be rejected because one of the critical values discovered is less than 0.05.

According to the research, the number of new technologies used by respondents exceeded the number of study participants, showing that some students owned more than one technology item. Smartphones surpassed all other emerging technologies (341, 95.5%), with IPAs coming in last (5, 1.4%).

In addition, cell phones (93.8%), internet (88.8%), laptops/desktops (86.8%), projectors (82.1%), electronic books (68.1%), Tablets (62.2%), and online courses (50.4%) are available and accessible to more than half of respondents in chosen study departments. This means that respondents can use these additional materials whenever they want.

Finding 1c: It was discovered that mobile phones, laptops/desktops, IPAs, projectors, e-books, internet, and e-learning laboratory equipment are divided evenly amongst departments depending on emerging resources available to respondents in the department. There are no statistically significant variations in these sources between departments.

Looking for 1d: On the other side, it was discovered that schedules, free online courses, cloud computing, projectors and laptops, and calculators differ by department. Some departments have more of these gadgets than others. Despite the fact that the projector was discovered to be evenly dispersed.

Because the results obtained against them are statistically significant, their application in diverse fields varies greatly. Meanwhile, the equipment detects a faint negative and a weak cross-departmental link.

Finding 2: The study discovered yet another poor link between respondents' use of new technological technologies and their academic ability. As a result, respondents' usage of technology and academic achievement had a positive and negative association. Meanwhile, the amount to which building technology is utilized to search for information on the internet is statistically significant, with a p value of 0.040.

5. Conclusion

According to the study's findings, the presence or availability of development technologies in various departments does not guarantee that they would be employed for student learning. If students are to profit from development materials, they must make a concerted effort to incorporate these resources into their learning style.

Again, students' utilization of development resources is insufficient to classify them as academic boosters. Because the resources that emerge serve a range of tasks, pupils' performance will suffer rather than increase if they utilize them for games or viewing movies, for example. The utilization of developing technologies does not ensure academic brilliance; rather, it is how pupils use it to learn efficiently.

According to the study's findings, there is a need to educate students on how to use emerging technology efficiently to overcome academic issues. According to the study's findings, most students believe that traditional learning methods assist them more than learning through emerging technology.

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