

Students' acceptance of Google Classroom as an effective Pedagogical Tool for Physical Education

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Research Article

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Abstract

Google Classroom is practical for teachers and students as it makes the teaching and learning process more manageable. It is one of the practical pedagogical tools used by various higher educational institutions, as supported by previous studies. In line with this, the study is focused on exploring the factors that affect students' acceptance of Google Classroom as an effective tool in learning Physical Education, adapting the Technology Acceptance Model (TAM). After obtaining data from 1,916 students currently taking minor PE in an online setting at City College of Angeles and after performing Partial Least Square-Structural Equation Modeling (PLS-SEM), the results revealed that students perceived ease of use positively predict their perceived usefulness of the LMS. Moreover, perceived ease of use positively influences students' behavioral intention to use. Also, the students' perceived usefulness increases behavioral intention to use Google Classroom in learning PE. Lastly, behavioral intent to use leverages students' actual use of the educational platform. The findings of this study help the academic council and higher administration to decide if the said LMS can continuously be used as the college is still in a full-online learning modality. Recommendations and future research directions are also presented.

Introduction

Across various educational institutions, online learning as a modality has offered numerous advantages during the pandemic. Even in this new normal, e-learning will still play a critical role in helping Higher Education Institutions to facilitate students' learning (Pokhrel & Chhetri, 2021). Flexibility, easy access, and interaction between learners and professors are some advantages of implementing online learning (Almahasees et al., 2021). From the numerous educational suites already introduced to students from various HEIs, Google Classroom is still one of the learning management systems that is highly used globally. Introduced in 2014 by Google Apps for Education (GAPE), Google classroom is an LMS and also a virtual classroom that allows teachers to create and organize educational materials and assignments more quickly, efficiently provide feedback promptly, and have ease of communication with their respective classes (Shaharaneet et al., 2016). Additionally, this LMS provides a streamlined communication system for teachers and students by providing a single access point to discussion threads and assigned work. Aside from these, teachers may quickly identify students besieged with their learning activities or projects due to the tracking mechanisms linked with the assigned tasks. Likewise, it helps teachers and students to keep their files organized since all work is stored paperless in a single program (Graham & Borgen, 2018). Added by Graham and Borgen, the fact Google Classroom is easy to use; this platform is also highly designed to save an amount of time; cloud-based, flexible, accessible, and most especially mobile-friendly. With this, Google classroom, as an LMS, is significantly effective for teachers and students. The effectiveness of Google Classroom as a pedagogical tool has been highly supported by previous studies (Kadwa & Alshenqeeti, 2020; Olufunke, 2020). Across the globe, in varying disciplines, numerous studies were already conducted in line with the effectiveness of Google Classroom as an effective instrument in facilitating teaching and learning. However, contrary to the Philippine setting, there were only a limited number of research papers conducted in the HEI context, especially in the setting of Local Colleges and

Universities (LCUs) in the Philippines, focusing on its effectiveness in learning Physical Education. Hence, an investigation regarding the effectiveness of Google Classroom is highly needed. In line with the need to conduct research, the main goal of this study is to explore the factors that could affect the acceptance of students towards the effectiveness of Google Classroom as a pedagogical tool in concept and skill acquisition in Physical Education. Moreover, since the college is still under a full-online modality due to ongoing infrastructure development and does not permit the teachers and students to return to limited face-to-face classes, the result of this study may provide valuable information to the teachers, academic council, and school administrators to assess the effectiveness of the LMS, and should be considered as a deciding factor if the college will continuously use the said system or not.

Review Of Related Literature

During the pandemic, numerous studies have been conducted concerning e-learning, online or blended learning; and the number of papers focusing on the effectiveness of Google Classroom as an LMS is still limited, most especially concerning its efficacy in providing a quality experience in learning Physical Education in a local college and university setting. Studies about Google Classroom are vast and evident from other countries and educational institutions in recent years, before the pandemic started, and even now during this post-pandemic period (R. A. S. Al-Marroof & Al-Emran, 2018; R. S. Al-Marroof et al., 2021; Han & Sa, 2021; Huang et al., 2021). Recent studies concerning the use of the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Extended Theory of Acceptance and Use of Technology (UTAUT2) have also been widespread and provided much information to various HEIs, the factors that affect the implementation of Google Classroom from various disciplines in a global scale (Alotumi, 2022; Delos Reyes et al., 2022; Kumar & Bervell, 2019). Aside from the factors indicated in these models, there have also been other studies that added other critical factors that predict students' utilization of a system (Brandford et al., 2021; Mahamud et al., 2021; Oluyinka & Cusipag, 2021). As mentioned above, these pieces of information will help other HEIs address students' needs and demands to facilitate a quality teaching and learning experience.

As mentioned earlier, e-learning will still play a significant role in various HEIs, which teachers and students can use to facilitate teaching and learning. The use of Google Classroom is still applicable even in this new normal of education, as there are still other HEIs worldwide still under a full-online modality, likewise in the current setting of this investigation. Educators across various disciplines can still utilize this particular LMS because of its availability and accessibility. Such as the study by Widiyatmoko (2021) revealed that Google Classroom is an effective system for supporting online learning in science subjects. However, several components need to be taken into consideration for the success of its implementation, such as students, teachers, online learning resources, and internet connectivity. Furthermore, a study conducted at Kebbie State University of Science and Technology Aliero (KSUSTA) revealed that Google Classroom effectively improves students' access and attention to learning, knowledge, and skills gained through the platform, making students active learners (Rani & Beutlin, 2020). Still, poor networks hinder students from using the LMS effectively, thus, resulting in late submission of outputs. Similarly, the

findings of Alim et al. (2019) revealed that Google Classroom is an effective instructional medium for various Islamic institutes in Indonesia; however, some limitations were presented, such as ownership of smartphones and limited Wi-Fi availability/ data subscription plans during online class discussions. Numerous challenges are still posing threats in the implementation of online through the utilization of Google Classroom that needs to be addressed, which are highly prevalent from studies that were conducted which most educational institutions are continuously striving in order to provide quality education to students (Ashraf et al., 2021; Clarin & Baluyos, 2022; Santos, 2021). On a positive note, even though there are a lot of challenges and barriers that students are experiencing, it can still be implied that Google Classroom has been an effective platform in facilitating the teaching and learning process based on previously conducted studies during the pandemic, and even in the new normal of education (Fauzi et al., 2021; Taja-on et al., 2021; Zuniga-Tonio, 2021).

Then again, challenges are still being faced by schools all over the world, most especially in facilitating online classes in Physical Education. Jeong and So (2020) findings revealed that the monotony of the classes within the limited environmental conditions and educational content did not adequately convey the value of physical education. As added by Jeong and So, trial-and-error methods are applied, resulting from a lack of expertise in the operation of physical education classes and limited evaluation guidelines, which made systematic evaluation with online methods impossible. Teachers have also reported difficulties motivating students because no visual connection is presented. Even with innovation, variety, and interaction, sport and physical education's practical and social nature does not fully translate in an online setting (Moustakas & Robrade, 2022). There is a minimal transfer of skills and knowledge to learners, even if comfort and safety are the advantages of online learning (Tegero, 2021). Furthermore, Chan et al. (2021) reported that lessons in PE were ineffective in improving motor skill acquisition and physical activity levels regardless of what LMS is utilized. One primary reason for this was the lack of practical training, students' lack of learning motivation and interest, and limited interpersonal interactions. The following studies have provided valuable information regarding the challenges in providing quality education through online learning in Physical Education subjects because of the discipline's nature. On the positive side, there are still triumphant moments and evidence reported during the pandemic and in the new normal in conducting Physical Education across the globe. The finding of Idris et al. (2021) revealed that the positive outcomes of having Physical Education in an online setting are becoming independent and adapting to the new normal. Also, online health and physical education students had a more favorable perception of their learning experiences, such as teachers' feedback and responsiveness, understanding related to the content, and perceived health gains (Webster et al., 2021). Overall, it can be implied that addressing these challenges experienced by teachers and students from various educational institutions should provide meaningful experiences to students in their Physical Education classes regardless of what learning management system to use, especially during the new normal.

Based on the previously conducted studies and literature mentioned above, there are only limited number of research papers that were conducted concerning students' acceptance towards using Google Classroom as a pedagogical tool in learning Physical Education, specifically in the context of local

colleges and universities in the Philippines. Hence, an empirical study is warranted. This study is solely focused on the exploration of factors that affects students' acceptance of Google Classroom. Moreover, this multidisciplinary investigation is aimed to provide valuable information to the existing literature filling the gap in between research concerning concept and skill acquisition in Physical education through Google Classroom.

Technology Acceptance Model (Tam) By Davis ()

Many Information systems (IS) and intention-based theories and models were already introduced, focusing on individuals' acceptance of new technology (Taherdoost, 2018). One of the most highly influential and commonly known models is the Technology Acceptance Model or TAM by Davis (1989). According to Davis, two primary factors influence an individual's intention to use a new technology: perceived ease of use and Perceived usefulness (Charness & Boot, 2016). The degree to which a person believes that using a particular system would be effortless is PEOU (Al-Bashayreh et al., 2022; Davis, 1989), while PU of a system is related to the productivity and effectiveness of the platform and its overall benefits to improve users' performance (Davis, 1989; Tahar et al., 2020). The application of this model is widespread across various disciplines in education (Castiblanco Jimenez et al., 2020; Zhou et al., 2022), industries (Peng & Yan, 2022; Portz et al., 2019), and even using TAM with other exogenous factors (He et al., 2018). Moreover, adapting TAM in assessing the level of students' acceptance of learning platforms, including Google Classroom, has been able to verify and establish PEOU and PU as primary external factors that influence their behavioral intention and the actual use of the system (Fauzi et al., 2021; Laurencia & Sudarto, 2021; Mahamud et al., 2021). Throughout the years, TAM has provided a solid background of its effectiveness in assessing the acceptance of new technology. The model implies that when learners are exposed to new technology, PEOU and PU are the crucial external factors that predict their acceptance decision. In this ongoing investigation, this study adapted TAM (without other exogenous variables), exploring the factors and measuring students' acceptance of Google classroom as a learning platform in their Physical Education classes. Based on the review of related literature performed, this study will test the following hypotheses:

H₁

Perceived ease of use positively influences the perceived usefulness of Google Classroom in learning Physical Education.

H₂

Perceived ease of use positively influences students' behavioral intention to use Google Classroom in learning Physical Education.

H₃

Perceived usefulness positively influences students' behavioral intention to use Google Classroom in learning Physical Education.

H₄

Behavioral intention of students influences the actual use of Google Classroom in learning Physical Education.

Method

Participants, Sampling Technique, and Sample Size

The selected participants for this study were composed of students from the 1st and 2nd year level currently enrolled in minor physical education classes for the 1st semester, Academic year 2022–2023 at City College of Angeles, located in the City of Angeles, in the Philippines. The respondents for this study were identified by using *Purposive sampling technique*. This sampling technique is a non-probability procedure where the researcher deliberately chooses participants for the study due to the qualities the participants possess (Lobo et al., 2022; Rodriguito et al., 2022). In order to identify the target sample for this study, *Raosoft Sample Size Calculator* was utilized. From the 2,500 total population of 1st and 2nd year students, the recommended sample size is 334. Exceedingly, there are 1,916 students who have successfully answered the survey questionnaire, and all the responses were accepted for data analysis after data cleaning.

Instrument

The gathering of data was performed through an online survey (Google forms) which was sent to all the target respondents. The survey is subdivided into two (2) parts: questionnaire's first part collected all respondents' demographic characteristics such as gender and the institute where they currently belong; the second part collected all data regarding the Technology Acceptance Model which has four constructs. These constructs are: *Perceived Usefulness* (PU), *Perceived Ease of Use* (PEOU), *Behavioral Intention* (BI), and *Actual Use* (AU). All items for each construct were adapted from Davis (1989), with some few adjustments such as the addition of the word "physical education" to tailor fit the instrument to the scope of this investigation. Responses are recorded in a 7-point Likert scale 1-extremely disagree and 7-extremely agree. The items that were used are shown in Appendix A.

Data Analysis

In order to explore the factors that affect students' acceptance of Google Classroom as learning platform in physical education, the *Partial Least Squares-Structural Equation Modelling* (PLS-SEM) using SmartPLS 4 was utilized. The statistical analysis used is highly suitable for this investigation (Ji et al., 2021). For the measurement model, scholars were advised to consider the outer loadings of the items and the average variance extracted (AVE) to establish convergent validity (Hair et al., 2021). Additionally, the utilization of the Fornell-Larcker criterion and Heterotrait-Monotrait criterion were also performed as

per the suggestion of Hair et al. (2021), in assessing and establishing discriminant validity. Lastly, for the structural model, the path coefficients and the coefficient of determination (R^2) were measured. Lastly, IBM SPSS version 27 was utilized for descriptive statistical analyses concerning respondents' demographic characteristics (gender and institute). In this, *frequency* (f) and percentage (%) were utilized.

Results And Discussion

Table 1
Demographic characteristics

Item	Values	f	Percentage
Gender	Male	723	37.7
	Female	1193	62.3
Institute	Institute of Education, Arts and Sciences	808	42.2
	Institute of Business and Management	790	41.2
	Institute of Computing Studies and Library Information Science	318	16.6

Table 1 illustrates the demographic characteristics of the respondents who have answered the online survey questionnaire. The results revealed that most respondents are female, which constitutes 62.3% of the collected data, while only 37.7% are males. Lastly, 42% are respondents from the Institute of Education, Arts and Sciences, 41.2% from the Institute of Business and Management, and 16.6% are from the Institute of Computing Studies and Library Information Science.

Table 2
Measurement Model Results

Constructs	Items	Loadings	CA	CR	AVE
Perceived Usefulness	PU2	0.917	0.937	0.955	0.840
	PU3	0.927			
	PU4	0.927			
	PU5	0.896			
Perceived Ease of Use	PE1	0.919	0.948	0.950	0.794
	PE2	0.890			
	PE3	0.928			
	PE4	0.925			
	PE5	0.834			
	PE6	0.845			
Behavioral Intention to Use	BI1	0.962	0.929	0.955	0.877
	BI2	0.962			
	BI3	0.883			
Actual Use	AU1	0.941	0.857	0.862	0.875
	AU2	0.929			
<i>Item loadings > 0.70, Cronbach's Alpha Value (CA) and Composite Reliability (CR) > 0.70, Average Variance Extracted (AVE) > 0.50 (P. M. dos Santos & Cirillo, 2021; Hair et al., 2021; Rodriguito et al., 2022).</i>					

In order to measure the reliability of each item, a factor loading analysis should be performed. According to Hair et al. (2021), a threshold value of equal to or greater than 0.7 for each item's loading is considered reliable. The Cronbach's Alpha Value and composite reliability should be equal to or greater than 0.7. Based on Table 2, all items are reliable and satisfy the criteria except for PU1, PU6, and PU7 since their factor loadings were below 0.7. Therefore, PU1, PU6, and PU7 were removed from the construct's structure. On the one hand, the average variance extracted (AVE) is used to validate constructs (P. M. dos Santos & Cirillo, 2021). It is also defined as the grand mean value of the squared loadings of the items related to the construct and the standard measure for establishing convergent validity. In order to determine the convergent validity, AVE should be at least 0.5 or greater, and the corresponding p-value must be at most 0.5 (Hair et al., 2021; Rodriguito et al., 2022). As shown in Table 2, Cronbach's Alpha and the composite reliability values are more significant than 0.7, and the AVE values are greater than 0.5. Hence, convergent validity has been established.

Table 3
Fornell-Larcker Criterion Results

	AU	BI	PEOU	PU
AU	0.935			
BI	0.769	0.936		
PEOU	0.777	0.841	0.891	
PU	0.655	0.732	0.764	0.917

In order to establish the discriminant validity, the Fornell-Larcker criterion, cross-loadings, and the Heterotrait-Monotrait Ratio should be inspected. Regarding the Fornell-Larcker criterion, the square root of AVE (diagonal value) in each variable should surpass the correlation of latent variables, as presented in Table 3.

Table 4
Cross Loading Results

	AU	BI	PEOU	PU
AU1	0.941	0.752	0.760	0.646
AU2	0.929	0.685	0.691	0.576
BI1	0.728	0.962	0.817	0.689
BI2	0.729	0.962	0.814	0.691
BI3	0.704	0.883	0.730	0.676
PE1	0.712	0.757	0.919	0.703
PE2	0.694	0.760	0.890	0.686
PE3	0.729	0.791	0.928	0.707
PE4	0.734	0.764	0.925	0.707
PE5	0.607	0.658	0.834	0.589
PE6	0.669	0.756	0.845	0.683
PU2	0.582	0.667	0.666	0.917
PU3	0.606	0.676	0.727	0.927
PU4	0.587	0.672	0.665	0.927
PU5	0.624	0.668	0.740	0.896

For the cross-loadings, the loading of each indicator should be higher than the loadings of its corresponding variables' indicators, as shown in Table 4.

Table 5
Heterotrait-Monotrait ratio (HTMT)

	AU	BI	PEOU	PU
AU				
BI	0.861			
PEOU	0.859	0.895		
PU	0.729	0.785	0.809	
<i>Heterotrait-Monotrait ratio (HTMT) < 0.90 (Henseler et al., 2015).</i>				

The Heterotrait-Monotrait ratio (HTMT), a value of less than 0.85, should be confirmed. However, in a more liberal approach, a threshold of .90 may be warranted, as TAM is an excellent example of this given to the study's large sample size (Henseler et al., 2015). As can be seen in Table 5, discriminant validity has been established.

Structural Model Assessment

The explanatory power of the model has been evaluated by measuring the discrepancy amount in the dependent variables of the model. As Hair et al. (2021) have stated, the R^2 and the path coefficients are the essential measures for assessing the structural model. As seen in Fig. 2, the model has R^2 value of PU is 58.4%, BI 72.7%, and AU 59.2% respectively.

Table 6
Hypotheses Test Results

Hypotheses	Path	Path Coefficient	<i>p-value</i>	Decision
H ₁	PEOU → PU	0.764	0.000	Supported
H ₂	PEOU → BI	0.678	0.000	Supported
H ₃	PU → BI	0.214	0.000	Supported
H ₄	BI → AU	0.769	0.000	Supported

Regarding path analysis, Fig. 1 and Table 6 revealed each hypothesis's path coefficients and p-values. Based on the findings, it can be noticed that all hypotheses tested for this study were supported, thus indicating that all paths are significant between the IV and DVs. First, H₁ ($\beta = 0.764$, $p < .05$) describes the path between PEOU and PU, which indicates that the perceived ease of use increases the usefulness of

Google Classroom in learning Physical Education. Second, H_2 ($\beta = 0.678, p < .05$) illustrates the path between PEOU and BI, and the result revealed that the perceived ease of use influences students' behavioral intention to use Google Classroom in learning Physical Education. Third, H_3 ($\beta = 0.214, p < .05$) labels the path between PU and BI, and it was discovered that perceived usefulness increases students' behavioral intention to use Google Classroom in learning Physical Education. Lastly, H_4 ($\beta = 0.769, p < .05$) illustrates the path between BI and AU, the findings revealed that behavioral intention positively influences students' actual use of the educational platform.

Based on the result, PEOU and PU positively influence students' behavioral intention in using Google classroom as a platform for learning various concepts and acquiring skills in physical education. Ergo, the findings imply that using the platform requires no effort and is easy to navigate, parallel to the discoveries of Kassim (2021). Moreover, it can also be interpreted that the students perceived Google classroom, which can enhance their class performance due to its accessibility and practicality. This particular result is similar to the findings of Heggart and Yoo (2018), one of the themes that emerged after analysis: the depth of students' participation and the authenticity of students' participation using Google Classroom. Likewise, incorporating the said platform as a pedagogical tool in physical education resulted in highly motivated students. The findings are analogous to other previously conducted studies concerning Google classroom effectiveness from various disciplines and educational institutions (R. A. S. Al-Marouf & Al-Emran, 2018; Fauzi et al., 2021; Khairani et al., 2020). Furthermore, this study only focuses on the effect of PEOU and PU as external factors that affect students' behavioral intention and actual use of the platform. Other factors were also discovered to affect the BI and AU of students, such as behavior intention, social expectancy, and performance expectancy (Mokhtar & Abu Karim, 2021), based on the Unified Theory of Acceptance and Use of Technology or UTAUT. Additionally, likewise with UTAUT, facilitating conditions, hedonic motivations, and event habits may also influence BI and AU of students towards the platform as per the Extended Unified Theory of Acceptance and Use of Technology or UTAUT2 (Alotumi, 2022; Venkatesh et al., 2016). With this, the study is constrained to the factors mentioned in the Technology Acceptance Model with no other extensions or exogenous variables.

As mentioned earlier, this study's findings benefit the City College of Angeles, especially the teachers, academic council, and the higher administration. The significant results discovered shall be considered as a deciding factor whether the college will continuously utilize Google classroom as an LMS or the other way around. This is in line with the continuous service of the college to provide quality education since the current school setting is still in a full-online learning modality.

Conclusion And Future Research Directions

Adopting the Technology Acceptance Model (TAM) determined that PEOU and PU significantly affect CCA students' BI and AU toward accepting Google Classroom as a pedagogical tool in learning concepts and acquiring skills in Physical Education after performing PLS-SEM. Familiarity with the system's utilization and effortlessness are the critical features of using the said platform. Additionally, one of the remarkable findings observed is that the CCA students may rely on Google Classroom as an educational platform

where they can quickly learn and acquire skills whereas leveraging the school's educational system. These findings may be valuable to the teachers, academic council, and even the school's higher administration. The derivation of this conclusion is supported by City College of Angeles' high reliance on this technology per previously cited constructs. In order to implement this pedagogical tool practically, the provision of various training opportunities is highly suggested for the students to explore the comprehensive and practical features Google classrooms can offer.

Most importantly, this study has some limitations which are very important to note. As mentioned in the discussion, the study is limited because it only adopted the Technology Acceptance Model without other exogenous variables. Furthermore, it was also emphasized in the discussion that other external factors could affect students' behavioral intention and actual use of the platform. In line with this, the study highly suggests conducting a similar study by adapting UTAUT, UTAUT2, or even other behavior-intention models and theories to determine other factors that could influence students' intention behavior and their actual use of Google Classroom. Also, using qualitative or mixed-method of the same is highly suggested as it will provide more profound and significant discoveries of various factors that could affect students' acceptance of the said pedagogical tool.

In addition, the data collected and analyzed for this study are controlled to students from the City College of Angeles, which may not generalize the entire local colleges and universities in Angeles City, in the province of Pampanga and the Philippines. Therefore, further investigation is warranted by collecting data from other local colleges and universities in the province to compare if the claims of this study may be supported or refuted. Moreover, future researchers may be curious to include the faculty members to understand how they perceive the use of the said educational platform and its effectiveness using the same model or other developed theories. Above all, this study contributes to the body of knowledge and existing literature, exploring and determining the factors that affect students' acceptance of Google Classroom in a local college and university setting since there is a scarcity of research conducted in the current setting investigation. Lastly, this study has demonstrated that its findings will support and fill the gap between research regarding the students' acceptance and the effectiveness of Google classroom as a pedagogical tool in providing quality education in physical education.

Declarations

Conflict of Interest

The author of this article declares no conflict of interest.

Availability of data and materials

The data and materials are available upon request.

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Appendix

Appendix A

Construct's items

Perceived ease of use

PEOU1: Google Classroom is easy to use.

PEOU2: Google Classroom enables me to access the PE course material.

PEOU3: Google Classroom is convenient and user-friendly.

PEOU4: Google Classroom allows me to submit my assignments.

PEOU5: Google Classroom requires no training.

PEOU6: Google Classroom makes it easier to avoid future academic difficulties.

Perceived usefulness

PU1: Google Classroom enhances my efficiency.

PU2: Google Classroom enhances my learning productivity.

PU3: Google Classroom enables me to accomplish tasks more quickly.

PU4: Google Classroom improves my performance in PE.

PU5: Google Classroom saves my time.

PU6: Google Classroom doesn't have any distinctive useful features.

PU7: Google Classroom is not applicable to all academic courses.

Behavioral intention to use

BI1: I intend to increase my use of the Google Classroom.

BI2: It is worth to recommend the Google Classroom for other students.

BI3: I'm interested to use the Google Classroom more frequently in the future.

Actual use

AU1: I use the Google Classroom on daily basis.

AU2: I use the Google Classroom frequently.

Figures

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Figure 1

Image not available with this version.

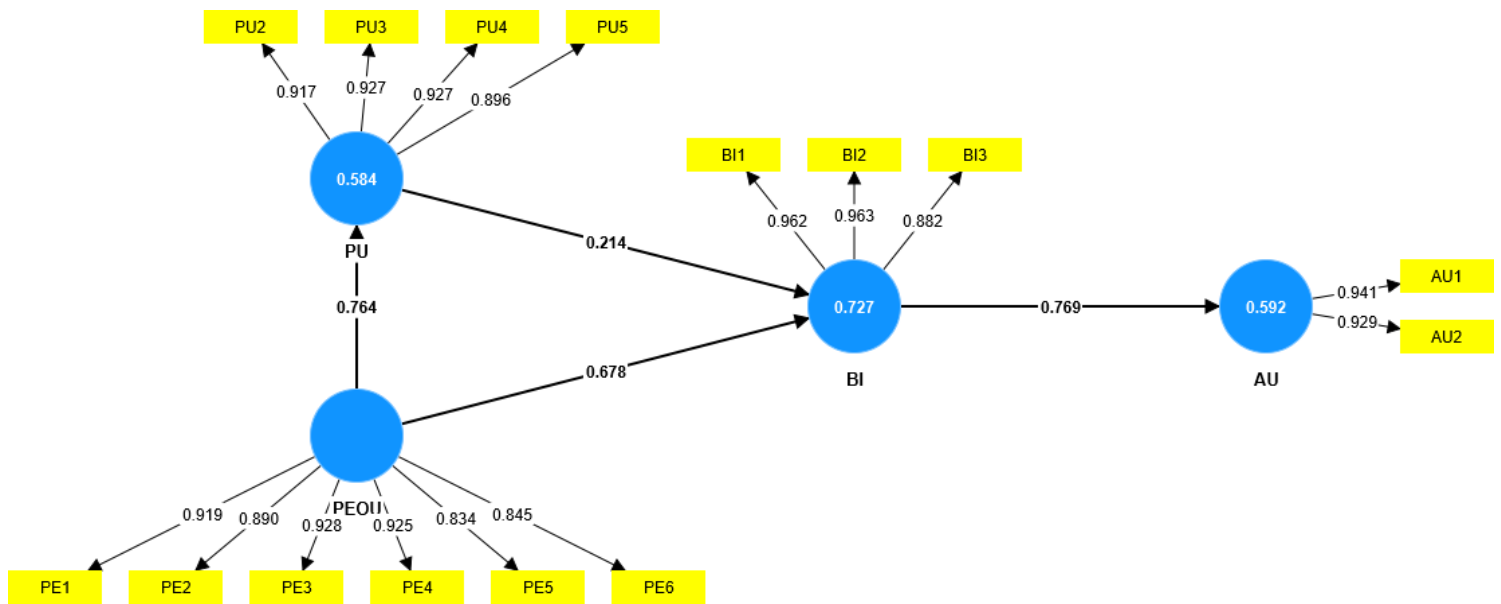


Figure 2

Path analysis Results