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Original Article

The Effect of Using the iPusnas App (Digital Library) on Literacy Skills and Learning Outcomes of Year 11 Economics Students at SMA Negeri 8 Kupang

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Abstract

This investigation was precipitated by the deficient literacy competencies and suboptimal academic attainment observed among eleventh-grade students in Economics at SMA Negeri 8 Kupang. The study sought to ascertain the magnitude of influence exerted by the utilization of the iPusnas application on students' literacy proficiencies and scholastic outcomes in Economics at the aforementioned institution. The inquiry employed a quantitative paradigm underpinned by a survey-based design. The aggregate population encompassed 105 eleventh-grade students, from which a cohort of 83 respondents was delineated through proportional random sampling. Empirical data were garnered via systematic observation, structured questionnaire dissemination, and documentary corroboration. Analytical procedures were executed through Structural Equation Modeling Partial Least Squares (SEM-PLS), operationalized through SmartPLS 4 software, encompassing the rigorous appraisal of both the outer and inner measurement constructs. The findings substantiated that the deployment of the iPusnas application exerted a positive and statistically consequential influence on students' literacy competencies. Concomitantly, literacy proficiency was found to bear a positive and significant bearing on academic attainment. Moreover, the utilization of the iPusnas application was independently corroborated to yield a positive and significant bearing on scholastic outcomes. Collectively, these findings affirm that the integration of the iPusnas application constitutes a demonstrably efficacious intervention in augmenting both literacy competencies and academic performance in the domain of Economics.

Keywords: Digital Library, Economics Education, iPusnas Application, Literacy Skills, Learning Outcomes.

1. Introduction

Human beings are creatures that are constantly developing in physical, intellectual, emotional and social terms. One of the key factors supporting this development is education. Education occupies an indispensable role in ameliorating the calibre of human capital through the cultivation of knowledge, competencies, values, and dispositional attributes requisite for navigating the exigencies of contemporary life. The Legislative Decree of the Republic of Indonesia No. 20 of 2003 pertaining to the National Education System stipulates that education constitutes a deliberate and systematically orchestrated endeavour to engender a pedagogical milieu conducive to enabling learners to actualize their inherent potential in its most comprehensive manifestation. Through education, individuals grow and develop into well-rounded persons, and the progress or regression of a nation's development across all sectors is largely determined by the nation's own level of education (Khairinal et al., 2020).

The term 'literacy' comes from the English word 'literacy', which means the ability to read and write. Over time, the narrow definition of literacy has broadened to encompass various other important fields (Maimunah, 2022). Further, Bu'ulolo (2021) note that literacy is broadly defined as language proficiency, encompassing the skills of listening, speaking, reading and writing, as well as the cognitive skills that form part of it. In line with the view Fayza et al. (2021) which states that literacy is the ability to read, speak, write, listen and utilise technology. Good literacy enables students to explore subject matter in greater depth, understand concepts thoroughly, and relate the information they have acquired to everyday life. Individuals with good literacy skills will be able to think critically, make sound decisions, and adapt to changing times. In an educational context, literacy is the key to students' ability to understand subject matter, broaden their horizons, and improve their learning outcomes.

Learning outcomes are often used as an indicator to assess the extent to which a person understands and has mastered the material studied. According to Andriani and Rasto (2019), Learning outcomes reflect the results of the learning process undertaken and indicate the extent to which pupils, teachers, the learning process and the educational institution have achieved the specified educational objectives. As noted by Nurita (2022), learning outcomes are an internal ability that has become an individual's own and the likelihood that person will act in accordance with the abilities they possess. In line with the views of Gorard et al. (2012), learning outcomes are the academic achievements attained by pupils during the teaching and learning process, which bring about changes in an individual's behaviour. High learning outcomes are the aspiration of various parties, including students, parents, and the school. All parties desire optimal learning outcomes as an indicator of success in the educational process and as a foundation for the students' future. However, the realisation of these aspirations is contingent upon a range of enabling conditions, among which literacy proficiency occupies a particularly central position. When students lack the foundational literacy skills necessary to engage meaningfully with learning materials, their capacity to achieve optimal academic outcomes is correspondingly diminished. This interdependence between literacy competency and learning achievement is not merely theoretical; it manifests concretely in classroom realities and institutional performance data, as evidenced by conditions observed in the present study's research site.

Based on observations and interviews with several teachers conducted by the researcher at SMA Negeri 8 Kupang, students' literacy skills are still relatively low. The low level of students' literacy skills is also reflected in their difficulties with writing, reading, analysing, and understanding lesson material. This is thought to be caused by several factors, including students' low interest in reading, the lack of a comprehensive book collection in the library, and students' reluctance to visit the library. Furthermore, students tend to spend more time playing, chatting with classmates, and using their mobile phones. Even the 15 minutes allocated for literacy activities before lessons begin are not utilised to their full potential. To reinforce the findings of the observations and interviews, the following presents data on literacy and student learning outcomes at State Senior High School 8 Kupang.

Table 1. Literacy Data of Year 11 Students, SMA Negeri 8 Kupang

No	Class	Number of Students	Average Literacy Score (Scale 1–75)	Literacy category
1	XI-1	35	42,80%	Low
2	XI-2	35	45,60%	Low
3	XI-3	35	44,10%	Low
	Total	105	44.2%	Low

Source: SPSS data analysis results

Table 2. Mid-term Summative Assessment (STS) Scores

No	Class	Number of Students	KKTP	Number of Students			
				Achieved		Not achieved	
				Total	Percentage (%)	Total	Percentage (%)
1	XI-1	35	75	13	37,14	22	62,85
2	XI-2	35	75	8	22,85	27	77,14
3	XI-3	35	75	9	25,71	26	74,28

Source: Economics teacher for Year 11 at SMA Negeri 8 Kupang

Looking at the empirical evidence presented in Table 1, it may be cogently inferred that the preponderance of students remain ensconced within the deficient stratum of literacy competency. The summary results of the questionnaire administered to 105 Year 11 students show an average literacy score of 44.2 out of a maximum score of 75. This indicates that students' learning literacy is still suboptimal, which ultimately impacts their low academic achievement. Furthermore, based on the data in Table 2, it was found that there are still many students with low learning outcomes; of the 105 students across the class, only 28.57% (30 students) met the Learning Objective Achievement Criteria (KKTP), whilst 71.42% (75 students) did not meet the Learning Objective Achievement Criteria (KKTP).

Efforts to address this issue can be made by enhancing the creativity of educational institutions and teachers in utilising available technology, one of which is by implementing the iPusnas application (digital library). Digital libraries are highly beneficial in helping students and teachers access all forms of learning materials, enabling them to easily develop their knowledge levels such as gathering information, enhancing analytical skills, and processing all information obtained through the digital library application. This is particularly helpful for those with limited access to physical books. Furthermore, iPusnas also supports digital literacy by encouraging users to read in digital formats, which aligns with current technological developments.

The iPusnas application constitutes a digitally-mediated bibliographic platform administered under the institutional stewardship of the National Library of the Republic of Indonesia. According to Nugroho et al. (2022) iPusnas is a digital library that makes it easy for the public to access books via their devices without having to buy them or visit a library. Furthermore, according to Salsabila et al. (2022) The iPusnas application constitutes a digitally-mediated bibliographic platform encompassing an expansive repository of literary works and an array of intellectually stimulating functionalities that learners may judiciously harness to augment their literacy proficiencies. By availing themselves of the iPusnas application, students are afforded the latitude to engage in reading pursuits irrespective of temporal or spatial constraints, thereby facilitating the propitious allocation of their discretionary time. The iPusnas application, as a digital library ecosystem, bears a demonstrably salutary influence on the amelioration of students' literacy competencies, whilst concurrently reinvigorating and resuscitating literacy endeavours conducted within a digitally-mediated paradigm. Students feel more enthusiastic and always set aside time to read the books available on the iPusnas app (Munthe et al., 2024). In line with the view by Salsabila et al. (2022) which states that the use of the iPusnas app can help improve pupils' literacy skills, as the iPusnas app—a digital library app which contains a vast collection of books and various engaging features that pupils can utilise to enhance their literacy skills.

In addition to improving literacy skills, the use of the iPusnas app can enhance pupils' learning outcomes. According to Sanjaya (2023), the use of interactive e-books in learning via the ipusnas digital library app makes it easier for pupils to study both independently and in

the classroom. Through features such as images, audio and educational videos, interactive e-books are able to capture pupils' attention and boost their motivation to learn as well as their academic performance. Furthermore, research findings (Wibowo, 2024) There is a positive and significant effect of the use of digital library applications on student learning outcomes.

The distinctive novelty of the present inquiry resides in its simultaneous empirical interrogation of the influence exerted by the iPusnas digital library application on students' literacy competencies and scholastic attainment within the disciplinary domain of Economics. In contradistinction to antecedent investigations, which have predominantly confined their analytical purview to the unilateral examination of digital instructional media upon learning outcomes or the amelioration of reading literacy in a generalized capacity, the present study effectuates a conceptual integration of digital library application utilization with two pivotal dimensions of the pedagogical process: literacy proficiency and students' academic achievement. This synthesizing orientation constitutes the study's most salient departure from extant scholarly discourse and underscores its substantive contribution to the evolving corpus of educational technology research. Furthermore, this study positions literacy skills as a variable that plays a role in supporting improvements in student learning outcomes. This study also makes an empirical contribution in the context of the use of educational technology at senior secondary school level, particularly among Year 11 students at SMA Negeri 8 Kupang, where research on the use of digital libraries as a learning resource in economics remains limited.

2. Literature Review

2.1. Literacy

The concept of literacy has undergone significant conceptual evolution over time. Etymologically derived from the English term literacy, its original meaning was confined to the ability to read and write. However, as Maimunah (2022) notes, this narrow definition has progressively broadened to encompass a far wider range of competencies across diverse fields. Bu'ulolo (2021) defines literacy in a broad sense as language proficiency that encompasses the skills of listening, speaking, reading, and writing, alongside the cognitive faculties that undergird these abilities. This perspective is further complemented by Fayza et al. (2021), who extend the definition to include the ability to utilise technology, reflecting the demands of an increasingly digital world.

Strong literacy skills enable students to explore subject matter in greater depth, comprehend concepts more thoroughly, and connect acquired knowledge to real-world contexts. At the individual level, literacy cultivates the capacity for critical thinking, informed decision-making, and adaptability to a rapidly changing environment. Within an educational context specifically, literacy serves as the foundational key to students' ability to understand subject matter, broaden their intellectual horizons, and ultimately improve their learning outcomes. The interdependence between literacy and academic achievement therefore underscores the necessity of fostering robust literacy habits throughout all stages of formal schooling.

2.2. Learning Outcomes

Learning outcomes are widely employed as a primary indicator of the extent to which a student has understood and mastered the material studied. Andriani and Rasto (2019) describe learning outcomes as reflections of the learning process undertaken, indicating the degree to which students, teachers, the instructional process, and educational institutions

have achieved their specified educational objectives. From a more internalized perspective, Nurita (2022) defines learning outcomes as internal capabilities that have become part of the individual, manifesting in the likelihood that the individual will act in accordance with those acquired abilities. Gorard et al. (2012) offer a behavioural dimension to this definition, characterizing learning outcomes as academic achievements attained during the teaching and learning process that bring about measurable changes in an individual's behaviour.

High learning outcomes represent a shared aspiration among students, parents, teachers, and educational institutions alike. They serve both as an indicator of success within the educational process and as a foundation for students' future development. Factors that influence learning outcomes are multifaceted, encompassing individual characteristics such as literacy skills, motivation, and learning habits, as well as external variables such as the instructional resources and technologies available to learners.

2.3. The iPusnas Digital Library Application

The iPusnas application is a digital library platform developed and administered under the institutional stewardship of the National Library of the Republic of Indonesia. According to Nugroho et al. (2022), iPusnas facilitates public access to books via personal devices, eliminating the need to purchase books or visit a physical library. Salsabila et al. (2022) further describe the application as a platform encompassing an expansive repository of literary works and a variety of engaging features that learners can utilise to augment their literacy proficiencies. Through iPusnas, students are able to engage in reading activities regardless of temporal or spatial constraints, supporting the productive use of discretionary time.

Empirical evidence suggests that the use of the iPusnas application exerts a demonstrably positive influence on both students' literacy competencies and their academic achievement. In terms of literacy, Salsabila et al. (2022) confirm that the application's extensive book collection and interactive features effectively help improve students' literacy skills, while Munthe et al. (2024) report that students who use iPusnas exhibit greater enthusiasm for reading and consistently allocate time for reading activities on the platform. With regard to learning outcomes, Sanjaya (2023) argues that interactive e-books accessed through iPusnas simplify both independent and classroom-based learning, with multimedia features such as images, audio, and educational videos boosting learners' motivation and academic performance. Supporting this, Wibowo (2024) reports a positive and significant relationship between the use of digital library applications and student learning outcomes, reinforcing the argument that technology-enhanced reading environments contribute meaningfully to academic achievement.

3. Methods

The present investigation employed a quantitative survey methodology as its overarching epistemological framework. The study population was constituted by 105 Year 11 pupils, from which a cohort of 83 respondents was delineated through the application of probability sampling. In accordance with Nurdin et al. (2018), probability sampling denotes a sampling technique predicated upon the principle of equiprobability, wherein every constituent member of the population is accorded an equitable and unbiased prospect of being designated as a sample member.

Empirical data were garnered through a tripartite collection protocol encompassing systematic observation, structured questionnaire dissemination, and documentary corroboration. The independent variable operationalized in this inquiry pertains to the utilization of the iPusnas Application (PAI), whilst the designated dependent variables

comprise literacy competency (KL) and academic attainment (HB). Analytical procedures were executed through Structural Equation Modelling with Partial Least Squares (SEM-PLS), operationalized via SmartPLS 4 software, incorporating the rigorous appraisal of both the outer measurement model and the inner structural model.

4. Results and Discussion

4.1. Research Results

4.1.1. Measurement Model (Outer Model) Evaluation

Consonant with the theoretical exposition advanced by Suryanto (2022), the outer model, alternatively denominated as the measurement model, delineates the relational configuration subsisting between the constituent indicator blocks and their corresponding latent variables. The measurement model functions as an indispensable evaluative instrument for scrutinizing the construct validity and psychometric reliability of the research instrumentation employed. Validity and reliability tests assess the quality of the instrument and the suitability of the data used in this study. This model illustrates the relationships between constructs and their indicators. This analysis was conducted to determine whether the measurement tools used are appropriate (valid and reliable) for the measurement.

4.1.2. Validity Test

A. Convergent Validity Test

The convergent validity assessment is undertaken with the express purpose of elucidating the veridical integrity of each relational nexus subsisting between an individual indicator and its underlying construct or latent variable. Consonant with the theoretical stipulations advanced by Ghozali (2016), individual indicators registering an outer loading coefficient exceeding the threshold of 0.7 are adjudicated as possessing acceptable psychometric validity.

Table 3. Outer Model Test Results

Indicator	Learning Outcomes	Literacy Skills	The Use of the IPUSNAS Application
HB1	0.854		
HB2	0.852		
HB3	0.836		
HB4	0.822		
KL1		0.780	
KL10		0.727	
KL11		0.745	
KL12		0.740	
KL13		0.774	
KL2		0.780	
KL4		0.778	
KL5		0.777	
KL6		0.766	
KL7		0.769	
KL8		0.766	
KL9		0.750	
PAI1			0.830
PAI10			0.845
PAI11			0,764
PAI12			0.845

Indicator	Learning Outcomes	Literacy Skills	The Use of the IPUSNAS Application
PAI13			0.764
PAI14			0.809
PAI15			0.851
PAI2			0.846
PAI3			0.831
PAI4			0.801
PAI5			0.842
PAI6			0.844
PAI7			0.794
PAI8			0.835
PAI9			0.845

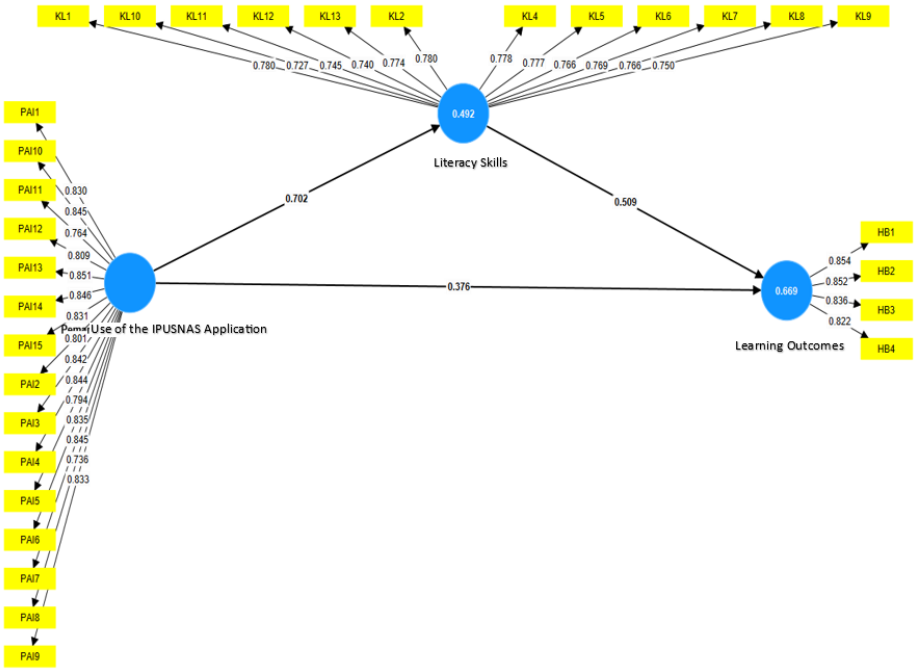

Figure 1. Outer Model

Based on Table 3 above and the model estimation results shown in the Figure 1 above, all indicators, namely the learning outcomes variable comprising 4 indicators, the Ipusnas application usage variable comprising 15 indicators, and the literacy skills variable comprising 12 indicators, have outer loadings above 0.70. Consequently, the model meets the criteria for convergent validity.

B. AVE (Average Varience Extracted) Value

The Average Variance Extracted (AVE) coefficient is designated to quantify the magnitude of variance inherent within a construct component that is attributable to its constituent indicators, whilst concurrently accommodating the commensurate degree of measurement error endemic to the analytical process (Chika et al., 2024). Within the analytical framework of Partial Least Squares Structural Equation Modelling (PLS-SEM), a construct is adjudicated as manifesting satisfactory convergent validity contingent upon the attainment of an Average Variance Extracted (AVE) coefficient meeting or surpassing the stipulated threshold of 0.50. Predicated upon the empirical outcomes yielded through data analysis conducted via SmartPLS 4 software, the ensuing AVE values were ascertained as follows:

Table 4. AVE (Average Varience Extracted) Value

Variables	AVE
Learning Outcomes	0,674
Literacy Skills	0,582
Use of the IPUSNAS Application	0,708

Source: SmartPLS 4 data analysis

Predicated upon the analytical outcomes delineated in the aforementioned tabular presentation, the Average Variance Extracted (AVE) coefficients for all constituent constructs were found to surpass the prescribed threshold of 0.50, thereby substantiating that all indicators encapsulated within each respective construct have satisfactorily fulfilled the requisite criteria pertaining to convergent validity.

C. Discriminant Validity Test

Discriminant validity is predicated upon the epistemological objective of ascertaining whether a reflective indicator constitutes a genuinely efficacious measure of its designated construct, grounded in the foundational principle that each constituent indicator ought to exhibit a substantially pronounced correlation exclusively with its own corresponding construct, whilst manifesting negligible associative affinity with extraneous constructs within the analytical framework (Natalia, 2018). Discriminant validity arises when two different measurement instruments, which measure two distinct constructs, produce scores that are uncorrelated with one another. The assessment is executed through the application of the Fornell-Larcker criterion, which entails the systematic juxtaposition of the square root of the Average Variance Extracted (AVE) for each designated variable against its corresponding correlation coefficient relative to all other extraneous variables subsisting within the analytical framework.

Table 5. Results of the Discriminant Validity Test

Variables	Learning Outcomes	Literacy Skills	The Use of the IPUSNAS Application
Learning Outcomes	0,842	(r HB-KL)	(r HB-PAI)
Literacy Skills	(r KL-HB)	0,763	(r KL-PAI)
Use of the IPUSNAS Application	(r PAI-HB)	(r PAI-KL)	0,821

Source: Data analysis using SmartPLS 4

Predicated upon the empirical evidence presented in the aforementioned tabular configuration, it may be cogently inferred that all variables encompassed within the present inquiry satisfactorily fulfill the prescribed criteria for discriminant validity. This substantiation is grounded in the observation that the square root of the Average Variance Extracted (AVE) values for each respective variable (0.842; 0.763; and 0.821) demonstrably exceed the corresponding inter-variable correlation coefficients subsisting amongst the variables delineated within the structural model.

4.1.3. Reliability Test

Used to assess the extent to which the instrument in question can be relied upon as a tool for data collection (Gamar et al., 2024). Subsequent to validity assessment, reliability testing is undertaken with the paramount objective of ascertaining that the constituent indicators encapsulated within each construct exhibit satisfactory internal consistency in their collective measurement of the same underlying latent variable. Conventionally, a construct is adjudicated as possessing adequate reliability contingent upon the simultaneous fulfillment of

the following psychometric benchmarks: a Cronbach's Alpha coefficient meeting or surpassing the prescribed threshold of 0.70, and a Composite Reliability value equivalently meeting or exceeding the stipulated minimum of 0.70. Predicated upon the empirical outcomes yielded through data analysis conducted via SmartPLS 4 software, the ensuing reliability coefficients were ascertained as follows:

Table 6. Reliability Test Results

Variables	Cronbach's Alpha	Composite Reliability
Use of the IPUSNAS Application	0,965	0,966
Literacy Skills	0,935	0,935
Learning Outcomes	0,862	0,863

Source: smartPls 4 data analysis

Looking at the empirical evidence delineated in the aforementioned tabular presentation, it may be cogently inferred that the reliability assessment outcomes substantiate that all variables encompassed within the present inquiry have satisfactorily fulfilled the prescribed criteria for psychometric reliability. This determination is unequivocally corroborated by the observation that the Cronbach's Alpha and Composite Reliability coefficients pertaining to all constituent variables uniformly attain or surpass the stipulated minimum threshold of 0.70. This means that each variable demonstrates a good and stable level of consistency in measuring the variables under investigation.

4.1.4. Internal Model Evaluation

Consonant with the theoretical exposition advanced by Sari et al. (2023), the inner model evaluation is undertaken to interrogate the relational configuration subsisting amongst the designated variables and to appraise the extent to which exogenous variables are capable of elucidating variance within the endogenous variables, thereby furnishing substantive responses to the postulated hypotheses. The structural model operationalized within the present inquiry delineates the relational nexus amongst the utilization of the iPusnas application, literacy competency, and students' academic attainment. This model was subjected to rigorous evaluation through the systematic analysis of the R-squared (R^2) coefficient to appraise the model's explanatory capacity, alongside the F-squared (F^2) value to ascertain the magnitude of contributory influence exerted along each designated path, whilst concurrently serving as the foundational basis for hypothesis adjudication through path coefficient examination.

A. R-squared Test

The R-squared coefficient is employed to appraise the predictive explanatory capacity of each endogenous latent variable encapsulated within the structural model. R-squared values of 0.75, 0.50, and 0.25 are correspondingly indicative of a robust, moderate, and deficient model, respectively.

Table 7. R-squared and Adjusted R-squared Values

Endogenous variables	R Square	R Square Adjusted
Learning outcomes	0,669	0,661
Literacy skills	0,492	0,486

Source: Data analysis using SmartPLS 4

Based on the table 7 above, it can be concluded that the use of the IPUSNAS application accounts for 49.2% of the variation in students' literacy skills. The combined use of the

IPUSNAS application and literacy skills accounts for 66.9% of the variation in students' learning outcomes. The research model has moderate to strong explanatory power.

B. F-test

The F-squared coefficient is deployed to quantify the magnitude of influence exerted by each individual exogenous variable upon the designated endogenous variable in an autonomous capacity. Consonant with the evaluative criteria conventionally subscribed to within the PLS-SEM analytical paradigm, the interpretive benchmarks pertaining to the F-squared value are delineated as follows: 0.02 denoting a negligible effect, 0.15 signifying a moderate effect, and 0.35 connoting a substantial effect.

Table 8. F-test Results

Relationships Between Variables	f^2	Effect Category
Use of the IPUSNAS Application → Literacy Skills	0,970	High
Literacy Skills → Learning Outcomes	0,397	High
Use of IPUSNAS → Learning Outcomes	0,217	Medium

Based on the F-square (f^2) analysis, it can be concluded that all paths in the model make a significant contribution to the endogenous variable, with two paths falling into the category of large effects and one path falling into the category of moderate effects.

4.1.5. Hypothesis Testing

Hypothesis adjudication within the present inquiry was executed through the deployment of the Partial Least Squares – Structural Equation Modelling (PLS-SEM) analytical framework, operationalized via a bootstrapping procedure within SmartPLS 4 software. The bootstrapping protocol was instituted to empirically scrutinize the statistical significance of the relational configurations subsisting amongst the designated constructs, through the systematic estimation of path coefficients (Original Sample/O > 0), t-statistics (t-statistic > 1.96), and p-values (p-value > 0.05).

Table 9. Hypothesis Testing Results

Relationships Between Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (SDEV)	T Statistics	P Values
The Use of the IPUSNAS Application and Literacy Skills	0.702	0.708	0.056	12.435	0.000
Literacy Skills and Learning Outcomes	0,509	0,507	0,091	5.569	0.000
The Use of the IPUSNAS Application and Learning Outcomes	0,376	0.378	0.097	3.886	0.000

Source: Data analysis using SmartPLS 4

4.2. Discussions

4.2.1. The effect of using the iPusnas app on literacy skills

Predicated upon the outcomes yielded through the bootstrapping analysis of the structural model, the path coefficient (Original Sample/O) was ascertained to be 0.702, the t-statistic was recorded at 12.435, surpassing the prescribed threshold of 1.96, and the p-value was established at 0.000, falling below the stipulated significance level of 0.05. A path coefficient of 0.702 exceeding the minimum benchmark of 0.05 substantiates that the

utilization of the iPusnas application exerts a positive and pronounced influence upon students' literacy competencies, connoting that progressive increments in the deployment of the iPusnas application are commensurately accompanied by appreciable enhancements in literacy proficiency. Literacy is no longer understood narrowly as the ability to read and write, but encompasses critical thinking, listening, speaking, and the use of technology (Bu'ulolo, 2021; Fayza et al., 2021). The iPusnas app provides a wide range of book collections and interactive features that support students' literacy activities (Salsabila et al., 2022). When students become accustomed to reading via digital platforms, they not only enrich their vocabulary but also develop analytical skills and conceptual understanding.

4.2.2. The Effect of Literacy Skills on Student Learning Outcomes

The second hypothesis posits that literacy competency exerts a consequential influence upon students' academic attainment. Predicated upon the outcomes yielded through the bootstrapping analysis, the path coefficient (Original Sample/O) was ascertained to be 0.509, the t-statistic was recorded at 5.569, surpassing the prescribed threshold of 1.96, and the p-value was established at 0.000, falling below the stipulated significance level of 0.05. A path coefficient of 0.509 exceeding the minimum benchmark of 0 substantiates that literacy competency exerts a positive influence upon students' academic attainment, connoting that progressive increments in a student's literacy proficiency are commensurately accompanied by appreciable amelioration in their scholastic outcomes. When students possess good literacy skills, they are better able to understand economic concepts, analyse cases, and connect theory with everyday practice. Literacy also develops focus, concentration, and critical thinking skills, which are essential for learning economics (Selviani et al., 2022).

4.2.3. The Effect of Using the iPusnas Application on Student Learning Outcomes

The third hypothesis postulates that the utilization of the iPusnas application exerts a consequential influence upon students' academic attainment. Predicated upon the outcomes yielded through the bootstrapping analysis, the path coefficient (Original Sample/O) was ascertained to be 0.376, surpassing the minimum benchmark of 0, the t-statistic was recorded at 3.886, exceeding the prescribed threshold of 1.96, and the p-value was established at 0.000, falling below the stipulated significance level of 0.05.

The culmination of these statistical indicators substantiates that the utilization of the iPusnas application exerts a positive influence upon students' academic attainment, connoting that progressive increments in the magnitude of iPusnas application deployment amongst students are commensurately accompanied by appreciable amelioration in the scholastic outcomes subsequently achieved. The use of e-books and digital resources enables students to learn flexibly and independently, as explained by Sanjaya (2023), who noted that interactive e-books can enhance motivation and academic achievement. Easy access to supplementary materials makes students better prepared for classroom learning. This is in line with the view of Hendrayanto et al. (2022) that iPusnas can support learning by providing a wealth of relevant books. Therefore, the digital library application serves as an effective alternative learning resource capable of improving students' learning outcomes.

In practical terms, school administrators are advised to formalise iPusnas integration within institutional digital learning policies and ensure adequate technological infrastructure to support consistent student access. Curriculum designers should align selected digital titles with specific learning objectives so that platform usage is meaningfully connected to assessed content, while classroom teachers are encouraged to embed structured iPusnas-based tasks — such as pre-lesson reading assignments and guided comprehension activities — directly into

their instructional routines, thereby maximising the application's potential as an active and purposeful driver of academic achievement.

5. Conclusion

The research findings demonstrate that the use of the iPusnas app is positively and significantly associated with students' literacy skills, with greater engagement with the platform showing a meaningful bearing upon reading activity, breadth of knowledge, and students' ability to comprehend and analyse information. Furthermore, literacy skills demonstrate a positive and significant association with students' learning outcomes, as stronger literacy proficiency appears to support students' capacity to understand economic concepts, interpret information, and think critically in ways that are conducive to academic achievement. Additionally, the use of the iPusnas app demonstrates a positive and significant bearing on students' learning outcomes, with access to flexible and easily accessible digital reading materials appearing to support deeper comprehension of economic concepts. Overall, this study indicates that iPusnas is meaningfully associated with enhancements in both literacy competencies and scholastic attainment within Economics education, and its integration into instructional practice, through literacy-based assignments, e-book discussions, or economic text analysis activities, constitutes a relevant and empirically grounded step toward improving the quality of learning in the digital age, though causal claims remain appropriately tempered by the cross-sectional nature of the research design employed.

Nevertheless, this study carries several limitations that warrant acknowledgement: the research scope was confined to a single school and subject area, thereby constraining the generalisability of the findings, and the study examined only the variables of iPusnas usage, literacy skills, and learning outcomes without accounting for other factors that may also exert influence on students' academic achievement. Future research is therefore encouraged to broaden the scope across multiple schools and subjects, and to incorporate additional variables so as to yield a more comprehensive understanding of the factors underpinning student learning outcomes in digitally-mediated educational environments.

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