Acceptance of Open-Source Software Technology Usage in the University Community

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ABSTRACT

The study investigates the adoption of Open-Source Software (OSS) within university communities, using the Technology Acceptance Model (TAM) as a theoretical framework. It focuses on three main components that are (1) perceived usefulness, (2) perceived ease of use, and (3) user confidence in the acceptance of OSS. The data were collected through a structured online survey with 209 participants, including students, lecturers, and administrators. The findings reveal that perceived usefulness is the most significant factor influencing OSS adoption, followed by confidence. However, perceived ease of use does not have a substantial impact on user confidence. These findings highlight the importance of showcasing the practical benefits of OSS and the need to build user confidence for successful adoption in academic environments. This approach is crucial for policymakers and educators seeking to create strategies that encourage the adoption of OSS, thus improving access to technology and stimulating innovation within universities.

Keywords— Acceptance Model (TAM), Open-Source Software (OSS), technology universities communities, technology acceptance, technology adoption

INTRODUCTION

Information and Communication Technology (ICT) has been dominated by copyright or proprietary software for decades. However, this scene is gradually changing with the increasing adoption of OSS, which is permeating various sectors, including business, economics, administration, government, and education, as evident in numerous technical and social platforms. Multiple institutions have considered OSS as a reliable alternative to other existing proprietary software. The adoption of OSS is significantly influenced by the potential for faster software delivery, low licensing costs, and the flexibility it claims to offer [1]. Most of the organizations that adopt OSS are driven by financial attributes perceived as little to no acquisition cost. Thus, OSS is emerging as a global phenomenon and a response to the worldwide proprietary control of the software design cycle [2].

The OSS movement is characterized by its four foundational freedoms: the ability to use the software for any purpose, study and modify its functionalities, redistribute its copies, and share improved versions [3]. These attributes have positioned OSS as a global phenomenon, challenging the dominance of proprietary software development [4]. Notably, the adoption of OSS has been institutionalized in many developing nations through government blueprints and policies, particularly in education, where cost-effective and customizable solutions are highly valued [5], as evident in the United States and Spain's higher education institutions [6].

The form of academic activities and the environment in which they are implemented influence the implementation of OSS in the education setting [7]. Such positive deployment can be seen in the form of educators' instructional activities to accomplish learning tasks, open-source web-based applications collaborations, examination delivery, classroom instructions [5], the development of e-learning, information processing, and structure, as well as virtual classrooms [8]. These activities primarily involve learners and educators, made possible by the adoption of OSS that helps eliminate the detrimental economic barrier to

technology accessibility in the education context [9]. In general, the implementation of OSS in education highlights the quality and benefits in the aspects of service level, student productivity, and student satisfaction [10, 6]. However, before the institution proceeds, it must address the question of agreement among higher education communities, including administrators, educators, and learners, regarding the actual potential they will enjoy from the OSS adoption. There is a need to consider these communities' acceptance and confidence in OSS before they can enjoy the innovative and fulfilling benefits of OSS adoption.

Generally, much literature mentions that demographic variables might influence the acceptance of software [11, 12]. It is sometimes the make-or-break scenario for software, applications, or systems, as acceptance varies among user groups, particularly in terms of their intentions and actual use. Another critical point to note is the confidence or the trust factor that could affect the adoption intention [12], which Chandra et al. [13] identified through the TAM [14] instrument. It is imperative to investigate the user's confidence or trust and their relation to the OSS adoption intention in the context of the higher education communities.

Here is where literature is indirectly lacking. It has not sufficiently explored the issues of acceptance and confidence surrounding the adoption of OSS in the education domain by the affected communities, i.e., the administrators, the educators, and the learners. It is in this area that the gap in knowledge concerning the acceptance and confidence factor of education institution communities towards OSS adoption lies, despite the many benefits it boasts. This study aimed to investigate the level of usage and confidence in OSS technology among university communities in their daily tasks and projects. This study is done to answer the following questions:

RQ1: How does perceived usefulness influence the acceptance of using open-source software technology?

RQ2: How does perceived ease of use influence acceptance in using open-source software technology?

RQ3: How does confidence influence acceptance in using open-source software technology?

The analysis and results can provide insights into the acceptance and confidence levels of higher education institution communities regarding OSS adoption, and whether such deployment can truly deliver benefits to its users.

LITERATURE REVIEW

Overview of Open-Source Software (OSS)

OSS has become increasingly important across various sectors, including education. Universities and research institutions widely recognize the value of OSS for teaching, research, and community engagement. OSS is defined as software whose source code is freely accessible, allowing users to examine, modify, and redistribute it. It differs from proprietary software, which keeps its source code closed, preventing users from viewing or altering it. OSS is also distinct from shareware, public-domain, and freeware, which may be free but do not provide access to the source code. According to Moyle [15], OSS is characterized by being open, unrestricted, and available for download from the Internet. Additionally, OSS promotes innovation and transparency through open access to source code, enabling extensive peer review and community-driven development. Feller and Fitzgerald [16] highlight that such collaborative development can lead to secure, high-quality, and cost-effective software. Similarly, Langerman and Daramola [17] note that OSS encourages active participation from both users and developers, further fostering innovation and reducing costs across industries. Overall, these findings underline the importance of OSS as a model that not only improves software quality but also drives collective innovation through openness and collaboration.

OSS holds significant importance in educational institutions due to its cost-effectiveness, adaptability, and educational value. OSS is critical in universities, where budget constraints often limit access to expensive proprietary software. OSS offers substantial financial advantages by eliminating licensing fees associated with proprietary software, which is particularly beneficial for schools and universities with limited budgets [16]. Additionally, OSS provides an opportunity for students and educators to engage directly with the software

development process, fostering practical skills in programming, system administration, and collaborative problem-solving [18]. The flexibility of OSS allows educational institutions to customize and adapt software to meet specific educational needs and integrate it seamlessly with existing systems [20]. Furthermore, the open nature of OSS aligns with the principles of academic openness and collaboration, supporting an environment of shared knowledge and innovation [19]. By adopting OSS, universities can provide students and faculty with powerful tools for learning, teaching, and research, fostering innovation and collaboration [18].

Advantages and Challenges of OSS Usage

OSS offers numerous benefits to universities, making it an attractive option for educational institutions. The primary advantage is cost efficiency. Unlike proprietary software, OSS typically does not require licensing fees, making it an attractive option for educational institutions with limited budgets, and it enables resource allocation for other academic needs [18]. Somaraj [20] supports this view, stating that using OSS can help schools save money, allowing them to invest in better facilities, expand programs, and provide greater support for students. OSS provides adaptable and cost-efficient solutions, empowering universities to meet both administrative and pedagogical needs. For example, Davuluru and Echezona [21] note how institutions can tailor OSS to specific operational workflows, while Somaraj [20] highlights its alignment with diverse instructional models and student learning preferences. These findings show that open-source software enhances the functionality of institutional systems while also supporting both operational needs and diverse teaching approaches, creating a more personalized, inclusive, and practical learning experience. This versatility empowers institutions to implement diverse pedagogical models and streamline academic workflows. OSS also offers valuable educational opportunities by allowing students to engage directly with the source code. This hands-on experience fosters the development of programming skills and a deeper understanding of software development processes [22].

Furthermore, the collaborative nature of OSS aligns with the academic ethos, promoting a culture of knowledge sharing and community engagement [39]. This collaborative environment encourages contributions to OSS projects, enhancing the sense of community and mutual learning among students and faculty. According to Gehrke & Wolf [22], open source embodies the ideals of openness, transparency, and sharing, while also fostering the development of digital citizenship and promoting the ethical use of technology. Adopting OSS presents several obstacles for university communities, beginning with the problem of technical support and maintenance. In contrast to proprietary software, OSS generally does not have official technical assistance; instead, it depends on internal knowledge and community forums, which can be inconsistent and unreliable [23]. It can make it more challenging to maintain and repair the software, especially for universities that might not have enough technical knowledge on staff. Furthermore, managing and resolving technical difficulties can take more time and resources when vendor assistance is lacking. Adding to this, Somaraj [20] notes that many educators and administrators feel unsure about using OSS for essential tasks like managing students or academic records. In the absence of guaranteed updates or official support channels, stakeholders may be reluctant to rely on OSS for critical operations.

Another common challenge with using OSS in universities is ensuring it integrates smoothly with existing systems. Many of these systems are built on proprietary platforms. Ven and Mannaert [24] point out that compatibility issues can arise when trying to integrate OSS into existing infrastructures. It can disrupt daily operations and require extra customization. Similarly, Sanieva [25] notes that technical difficulties often come up when trying to connect OSS with the software used in academic courses. Fixing these issues can take up a lot of time and resources, making the transition to open-source tools more complicated than it might first appear. Moreover, stakeholders who are used to proprietary systems and have doubts about the dependability and security of open-source software may oppose adoption [26]. Planning thoroughly, educating stakeholders, and implementing strong management techniques are all necessary to overcome these biases and guarantee a seamless shift to OSS.

Technology Acceptance Model (TAM) in Education

The TAM provides a valuable framework for understanding how educational technology, including OSS, is adopted by educators and students. TAM posits that perceived ease of use and perceived usefulness significantly influence technology adoption [14]. In educational settings, OSS can offer several advantages, such as cost-

effectiveness and customization, which align with the TAM constructs. For instance, research has shown that educators who perceive OSS as user-friendly and beneficial for their teaching are more likely to integrate these tools into their practices [27]. A study by Liu, Liu, and Zhang [28] found that the perceived usefulness of OSS, combined with its low cost, contributes to its growing acceptance in educational environments, suggesting that TAM is effective in explaining the adoption of OSS in schools.

Moreover, TAM helps elucidate how open-source software can address barriers to technology adoption in education. OSS often provides flexibility and adaptability, which can enhance perceived ease of use and usefulness by allowing educators and institutions to tailor software to their specific needs [29]. Research by Kuo and Chang [30] indicates that when educators are provided with training and support for OSS, their perceptions of these tools' ease of use and usefulness improve, thereby fostering greater acceptance and integration. This alignment with TAM highlights how the OSS can be leveraged to overcome challenges in technology adoption in educational settings, making it an asset for enhancing teaching and learning processes.

Past Studies on The Acceptance of OSS in Higher Institutions

The acceptance of OSS within university communities has been a subject of various studies, highlighting the potential benefits and challenges associated with its adoption. One significant study by Gonzalez-Barahona et al. [40] examined the role of OSS in computer science education at the university level, emphasizing its ability to reduce costs and enhance learning through collaborative development and customization. The study noted that universities could leverage OSS to tailor software to specific educational needs, fostering an environment of innovation and skill development among students and staff. This flexibility and adaptability of OSS make it a valuable resource for academic institutions aiming to provide cutting-edge educational tools without the financial burden of proprietary software licenses.

Meanwhile, Gupta and Surbhi [38] explore the multifaceted benefits and challenges associated with the integration of OSS in educational environments. The study highlights that OSS offers significant cost savings, flexibility, and opportunities for customization, which are particularly advantageous for academic institutions with limited budgets. Additionally, the authors emphasize the role of OSS in fostering a collaborative learning atmosphere, where students and educators can contribute to and benefit from a global community of developers. However, the paper also addresses challenges such as the need for adequate training and support, resistance to change from traditional proprietary systems, and potential compatibility issues. Gupta and Surbhi [38] conclude that with strategic implementation and strong institutional support, the adoption of OSS in education can lead to enhanced learning experiences and improved technological proficiency among students.

Furthermore, Yaseen and Bahari [9] present a comprehensive framework to understand the adoption of OSS in Malaysian university ICT centres. The study identifies key factors influencing OSS adoption, including organizational readiness, perceived benefits, external pressures, and the availability of technical support. The authors argue that organizational readiness, which encompasses the institution's technological infrastructure and staff competencies, plays a critical role in the successful implementation of OSS. They also highlight the importance of perceived benefits such as cost savings, enhanced security, and customization capabilities in driving adoption. Additionally, external pressures from government policies and peer institutions, along with robust technical support, are crucial in facilitating OSS adoption. Yaseen and Bahari [9] conclude that a strategic approach addressing these factors can significantly enhance the acceptance and integration of OSS in university ICT centres.

Another study by Racero, Bueno, & Gallego [6] investigates the factors influencing students' intention to use OSS. The study combines the Technology Acceptance Model (TAM) and Self-Determination Theory (SDT) to develop a comprehensive model that includes constructs such as autonomy, competence, relatedness, perceived ease of use, perceived usefulness, and behavioural intention to use. The findings reveal that intrinsic motivations like autonomy and relatedness significantly improve students' perceptions of OSS's effectiveness and ease of use, which in turn positively affect their intention to use OSS. The study used a survey method to collect data from 352 participants who had received mandatory OSS training. The results underscore the importance of fostering an environment that supports autonomy and relatedness to improve the acceptance of OSS in educational settings. Moreover, the research highlights the role of competence in influencing students'

confidence and willingness to use OSS. The implications of this study suggest that educational institutions should emphasize training and support to boost students' intrinsic motivations, ultimately leading to higher OSS adoption rates.

In addition, the study done by Alrawashdeh et al. [11] examines the factors influencing the acceptance of OSS across different organizations, incorporating OSS characteristics and the Unified Theory of Acceptance and Use of Technology (UTAUT). The research, involving a sample of 255 individuals from both public and private sectors, finds that software quality, interoperability, and security significantly impact performance expectancy (PE). Additionally, PE, cost, facilitating conditions, social influence, and self-efficacy notably affect behavioural intention. A new path between effort expectancy (EE) and PE was also identified. The results highlight the need for improving OSS user-friendliness and suggest that performance expectancy, effort expectancy, social influence, self-efficacy, and various software attributes are crucial for OSS acceptance and implementation.

Past studies on the acceptance of OSS have provided valuable insights into the factors influencing its adoption across various sectors. A key finding is that perceived ease of use and perceived usefulness play crucial roles in OSS adoption, consistent with the TAM. For instance, a study conducted in 2013 by Kuo and Chang [30] showed that educators' perceptions of OSS as user-friendly and beneficial significantly impact their willingness to incorporate these tools into their teaching practices. The research revealed that when educators find OSS intuitive and valuable for educational purposes, they are more likely to adopt and utilize these tools effectively. It demonstrates how user perceptions play a significant role in OSS acceptance and how the model may be applied in circumstances other than those of typical proprietary software.

In addition, studies have also investigated how OSS's acceptance is impacted by its community-driven nature. According to Wang and Zhang's [31] research, the collaborative and customizable features of OSS can enhance its perceived usefulness, particularly in environments where flexibility and cost savings are critical. The study highlighted that the active involvement of users in OSS development and support can further increase acceptance by creating a sense of ownership and tailoring the software to specific needs. This community aspect can contribute to higher levels of trust and satisfaction, leading to greater adoption. Overall, these studies show that although OSS has difficulties, its potential advantages and user-driven development can help to increase its adoption and integration across a range of sectors.

Conceptual Framework

The TAM is a widely used framework in information systems research that aims to explain and predict user acceptance of technology. According to the TAM, user acceptance is primarily influenced by two key factors: Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). In the context of OSS acceptance, the conceptual framework often extends the TAM by incorporating additional variables to capture the unique aspects of OSS. This framework seeks to explain the factors influencing users' acceptance of OSS, which is characterized by its freely accessible source code and collaborative development model. The primary variables in this framework are Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Confidence (C), and Acceptance (A). Each variable plays a critical role in shaping users' attitudes and intentions toward OSS. Figure 1 illustrates how these four components influence OSS acceptance in university communities. The following section shows the details of these components.

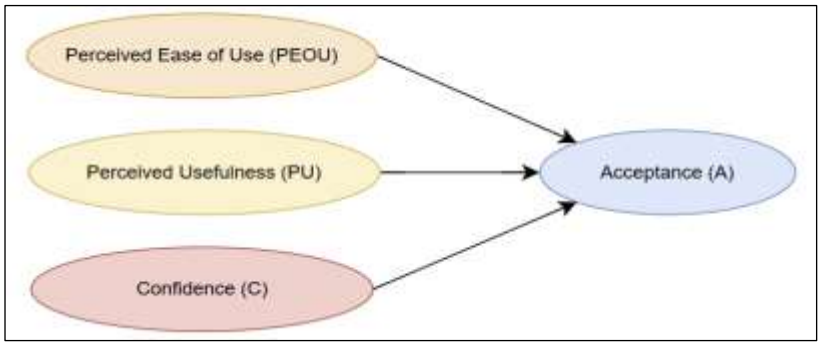

Figure 1: The Proposed Framework of OSS Acceptance in the University Community

The first component, Perceived Ease of Use (PEOU), is a key element of the framework, indicating users' perceptions of how simple they think using OSS will be. It plays a crucial role in reducing entry barriers for users, especially for those with limited technical skills. In OSS environments, where users encounter different interfaces and features, the perception of ease of use is essential for promoting adoption. Studies show that when users find a technology easy to use, their perception of its usefulness also increases, thereby enhancing their overall acceptance [42, 43]. The second component, Perceived Usefulness (PU), pertains to the degree to which users believe that the OSS will enhance their performance or productivity. In the context of OSS, PU is particularly relevant as it encompasses the software's functionality, reliability, and overall impact on the users' tasks and goals [14]. Studies indicate that higher PU leads to increased user acceptance and intention to use technology, as demonstrated in studies on mobile technology and e-learning systems [44, 45]. Both PEOU and PU are recognized factors influencing technology acceptance and have been confirmed in many studies [14, 32].

The third component, Confidence (C), signifies users' self-efficacy or their conviction in their capability to utilize technology proficiently. It plays a vital role as it influences both the perceived ease of use and perceived usefulness of OSS. Users who possess greater confidence are more inclined to explore and effectively use OSS features, improving their overall experience. According to Bandura [34], greater confidence helps users overcome usability challenges and better recognize the benefits of the technology. The fourth component, Acceptance (A), refers to a user's readiness and intention to utilize technology to enhance educational objectives. It is pivotal in understanding how various elements influence the integration of technology into educational practices. Acceptance is often explained using well-known frameworks like the TAM, which highlights that people are more likely to adopt a technology when they find it valuable and easy to use [14, 32, 46, 47].

METHODOLOGY

This study employed descriptive research and used an online questionnaire to gather data. The researchers personally administered the questionnaire. The respondents were asked to assess the factors of acceptance towards OSS technology from an education perspective on a 5-point Likert scale (1=strongly disagree, and 5=strongly agree). The questionnaire was adopted and adapted from several studies, especially the study that involved OSS technology and OSS education. The survey method was used to investigate the factors that influence OSS technology acceptance among university students (Diploma, Degree, Master and PhD) and information technology (IT) staff.

The questionnaire's instrument comprised demographic profiles of participants, perceived ease of use, perceived usefulness, confidence, and acceptance. The demographic section comprised 6 items to gather background information on participants. The perceived ease of use and perceived usefulness sections each included 5 items to evaluate participants' views on the usability and potential benefits of open-source software—the confidence section, with 5 items, measured participants' self-assurance in using open-source technology. Finally, the acceptance section contained 4 items to gauge participants' overall willingness to adopt and use open-source software in their academic environment.

The questionnaire was formulated in English to facilitate comprehension, considering that the educational attainment of most respondents was up to the tertiary level. A total of 209 respondents participated in this study. The primary rationale for utilizing online questionnaires in this research is their efficiency in data collection, which saves the researchers time, effort, and financial resources. A simple random sampling method was applied in selecting the prospective participants. Cross-sectional surveys employed questionnaires to gather the necessary data. The researchers oversaw the distribution process of the questionnaires until completion to ensure a high response rate. The data obtained from the survey were analyzed using the Social Science Statistics Package version 25 (SPSS). In addition to descriptive statistics, this study also utilized Pearson correlation to examine and explore the relationships among the variables. While the study employed simple random sampling, the final respondent distribution was heavily weighted towards students (82.3%), with lecturers (4.6%) and administrators (12.9%) comprising smaller proportions. It is important to note that this imbalance may potentially cause the results to primarily reflect student perceptions rather than those of the broader university community.

FINDINGS

In this study, all 209 online questionnaires were randomly distributed and collected, which signified a response rate of 100.00%. The questionnaires were distributed to university communities, including IT staff, academicians (lecturers), and students (undergraduate and postgraduate), to assess their level of usage and confidence in using OSS technology in their daily tasks and projects.

Profile of Respondents

In terms of gender, the number of female and male respondents in this study is relatively balanced, with 48.3% (101 respondents) being female and 51.7% (108 respondents) being male. Generally, the respondents in this study were mainly coming from universities communities, with the largest age group being 21 to 30 years old (56.9%; 119), followed by 18 to 20 years old (20.6%; 43), 31 to 40 years old (14.8%; 31), 41 to 50 years old (6.7%; 14), and 51 to 60 years old (1%; 2). No respondents were aged 61 years and above. From the studies that have been completed, students are the most significant number of respondents in this study (82.3%; 172). There are 3 types of students, which are undergraduate students (Diploma Level) (41.1%; 86), undergraduate students (Degree Level) (38.8%; 81), and postgraduate students (Master/PhD Level) (2.4%; 5). Since most of the university's communities are students, it is reasonable to assume that the high number of respondents recorded is coming from students. To demonstrate OSS technology's widespread acceptance among students, we also gathered responses from lecturers and administrators. For the lectures, the number of respondents is 4.6% or 10 respondents, while administrators are 12.9% or 27 respondents. It is important to note that the sample is heavily weighted towards students, with lecturers and administrators comprising a much smaller proportion, potentially causing the results to primarily reflect student perceptions rather than those of the broader university community.

In terms of frequency, most respondents (43.1%; 90) use OSS technology more than 5 times per month, while 37.3% (78) use it between 2 and 5 times per month. Only 19.6 per cent, or 41 respondents, used the OSS technology once per month. The value of this usage is considered an important attribute to demonstrate how familiar OSS technology can be to all respondents. Apart from that, the study shows that the most common reason for using OSS is to complete student assignments and projects, which contributes to 63.2% (132 respondents), followed by research purposes (17.7%; 37), network management (Firewall/VPN) (8.6%; 18), network troubleshooting (6.2%; 13), and, lastly, network monitoring (4.3%; 9). Lastly, in terms of the respondents' preference for using OSS technology, 90.4% (189) are comfortable with it, while 9.6% (20) do not prefer to use it.

Table 1 Demographic Profile (n = 209)

	Categories	**Frequency**	**Percentage (%)**
Gender	Female	101	48.3
	Male	108	51.7
Age	18-20 years old	43	20.6
	21-30 years old	119	56.9
	31-40 years old	31	14.8
	41-50 years old	14	6.7
	51-60 years old	2	1
	61 and above	0	0
Occupation	Undergraduate Student (Diploma Level)	86	41.1
	Undergraduate Student (Degree Level)	81	38.8
	Postgraduate Student (Master/PhD Level)	5	2.4

	Lecturer	10	4.6
	Administrator	27	12.9
Usage frequency	1 time per month	41	19.6
	2 - 5 times per month	78	37.3
	more than 5 times per month	90	43.1
Purpose of usage	Student assignment/project	132	63.2
	Research	37	17.7
	Network monitoring	9	4.3
	Network management (Firewall/VPN)	18	8.6
	Network troubleshooting	13	6.2
Prefer to use open source	Yes	189	90.4
	No	20	9.6

Reliability Analysis

Table 2 shows the reliability results for all the measurements tested in the study. There was substantial variation in Cronbach's Alpha values for all variables, ranging from .735 to .898. Nunally and Bernstein [35] suggested that Cronbach's alpha values greater than .70 are generally considered desired or adequate. Thus, this shows that all four (4) variables in this study met the threshold of the analysis. The measurements of perceived ease of use, perceived usefulness, acceptance, and confidence were acceptable, valid, and reliable.

Table 2 Reliability Statistics

Variable	Cronbach's Alpha	N of Items	N of Deleted Items
PEOU	.735	5	–
PU	.898	5	–
Acceptance	.880	4	–
Confidence	.870	5	–

Correlation Analysis

The result of Pearson's correlations between all variables is illustrated in Table 3. All tested variables were positively and significantly correlated with each other ($p < .01$). This shows that all variables have a strong association with each other.

Table 3 Pearson Correlation Analysis

Variable		PEOU	PU	Confidence	Acceptance
PEOU	Pearson Correlation	1	.718**	.721**	.639**
	Sig. (2-tailed)		.000	.000	.000
PU	Pearson Correlation	.718**	1	.717**	.732**
	Sig. (2-tailed)	.000		. 000	.000
Confidence	Pearson Correlation	.721**	.717**	1	.726**

	Sig. (2-tailed)	.000	.000		.000
Acceptance	Pearson Correlation	.639**	.732**	.726**	1
	Sig. (2-tailed)	.000	.000	.000	
**. *Correlation is significant at the 0.01 level (2-tailed).*					

Regression Analysis

From the results, two variables that are perceived usefulness and acceptance were significant predictors of the confidence in using OSS technology, with results (p=0.000). In contrast, perceived ease of use (p = 0.304) was the only one that was not significant at the confidence level. The summary of these regression results is presented in Table 4. A session of regression analysis was conducted to test the research objective: to observe the relationships between perceived ease of use, perceived usefulness, and acceptance, and their relationship with confidence among the university's communities. Based on the findings', perceived usefulness is the most influential variable towards the acceptance of OSS technology usage, with a t-value of 5.636 and a beta value of 0.384, being the highest compared to other variables.

Table 4 Multiple Regression Analysis

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
	.583	.198		2.942	.004
PEOU	.078	.076	.070	1.030	.304
PU	.423	.071	.406	5.985	.000
Confidence	.378	.067	.384	5.636	.000

DISCUSSION

This study aimed to investigate the impact of perceived usefulness, perceived ease of use, and confidence on the acceptance of OSS technology within university communities. The findings and discussions presented aim to answer the research questions and can be summarized as follows:

RQ1: How does perceived usefulness influence the acceptance of using open-source software technology?

The study found that perceived usefulness is the most significant predictor of OSS technology acceptance, with a strong positive correlation ($p < .01$) and a high t-value of 5.636 and beta value of 0.384. It suggests that university communities are more likely to accept OSS if they perceive it as beneficial to their tasks and projects. This finding aligns with the TAM, where perceived usefulness is identified as a key determinant of technology adoption [14]. Similar results were observed in studies by Venkatesh and Davis [32], where perceived usefulness significantly influenced users' intention to use new technologies. The substantial impact of perceived usefulness on acceptance underscores its importance in promoting OSS adoption in educational settings.

RQ2: How does perceived ease of use influence acceptance in using open-source software technology?

While perceived ease of use was positively correlated with acceptance of OSS, it was not a significant predictor of confidence ($p = 0.304$). It suggests that although ease of use contributes to users' acceptance of OSS, it may not be as crucial as perceived usefulness in influencing their confidence. This finding contrasts with earlier studies, where perceived ease of use was often highlighted as a critical factor in technology adoption [33]. However, it is consistent with research that suggests in more experienced user populations, such as university communities, the focus shifts from ease of use to the practical utility of the technology [36].

The specific characteristics of the sample may explain this result. Most respondents were students who, due to their academic environment, may already have a basic familiarity with various digital tools and platforms, including OSS. Therefore, ease of use might not be crucial in building their confidence because they can adapt to new software regardless of its initial difficulty. It aligns with literature suggesting that in more digitally literate populations, perceived ease of use becomes less significant compared to factors such as functionality, performance, and relevance to task completion. Furthermore, because student respondents dominate the sample (as noted in the Profile of Respondents), the findings may mirror generational ease with technology that reduces usability issues.

However, in a more demographically diverse or less technologically skilled population, perceived ease of use might become a more significant predictor of confidence. Future research could explore this further through qualitative methods, such as interviews or focus groups, to gain deeper insights into the reasons behind this relationship among different user groups. Therefore, although ease of use remains important, its role may be secondary to usefulness in this context.

RQ3: How does confidence influence acceptance in using open-source software technology?

The study showed that confidence in using OSS is significantly influenced by perceived usefulness and acceptance ($p = 0.000$). It indicates that users who feel confident in their ability to use OSS are more likely to accept it. Confidence acts as a mediator between perceived usefulness and acceptance, highlighting the importance of building user confidence to foster greater adoption. This finding is consistent with studies that emphasize the role of self-efficacy and trust in technology acceptance [37]. Users are more likely to adopt technology when they feel capable of using it effectively, further reinforcing the need to support users in gaining confidence with OSS.

Hence, these findings suggest that efforts to promote OSS in university communities should focus on demonstrating its practical benefits and building users' confidence, rather than solely emphasizing ease of use. It is further supported by Patiño-Toro et al. [41], who found that practical skill development enhances students' self-efficacy and confidence, which in turn significantly fosters their adoption and engagement with open-source software.

A key limitation of this study is the unequal number of student respondents compared to lecturers and administrators. It is important to note that this imbalance might lead to results that mainly reflect student perceptions rather than the views of the broader university community. Future studies should aim for a more balanced sample to achieve greater generalizability across the university community.

CONCLUSION

The study's conclusions offer insightful information on the variables influencing college students' adoption of open-source software. Firstly, one important factor that emerged was perceived usefulness. The study emphasizes how vital perceived usefulness is in influencing OSS adoption. It is consistent with the TAM, which holds that one of the main factors affecting the acceptance of technology is perceived usefulness. When university communities believe that OSS can help them achieve their goals or boost productivity, they are more inclined to adopt it. The promotion of OSS adoption should focus on highlighting its practical applications and how it integrates with users' daily tasks.

Secondly, the perceived ease of use has a limited role. It is interesting to note that users' confidence in OSS was not considerably impacted by perceived ease of use. This finding contrasts with some prior studies where ease of use was found to be a critical factor in technological adoption. One possible explanation for this discrepancy could be that university communities are already familiar with various technologies and may prioritize the utility of the software over its ease of use. Therefore, while ease of use is essential, it may not be as crucial as perceived usefulness in this specific context. And lastly, confidence or self-assurance as a mediator. The significant role of increasing users' confidence in OSS technology is highlighted by the substantial correlation found between acceptance and confidence. Confidence not only reflects users' belief in their ability to use the software

effectively but also influences their willingness to adopt it. The results suggest that confidence can be enhanced by increasing the perceived usefulness of the software, thereby encouraging greater acceptance.

In conclusion, the study indicates that fostering OSS adoption in educational settings should concentrate on increasing the perceived usefulness of the technology and bolstering users' trust or confidence. By tackling these elements, universities can promote broader and more effective utilization of OSS within their communities. Upcoming initiatives to encourage OSS utilization should place a strong emphasis on showcasing the concrete advantages and real value of these tools to prospective users, as this can significantly promote their adoption. Therefore, future studies could also use qualitative methods, such as interviews or focus groups, to gain a deeper understanding of why perceived ease of use might have a limited effect on user confidence, especially among highly tech-literate groups. The sample mainly consisted of students, which could limit how well the findings reflect the views of the entire university community.

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