

Model Innovation Capability in Learning Process of Indonesian University: Determinant Analysis of Innovation Diffusion Theory

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Received: October 22, 2023

Accepted: January 25, 2024

Online Published: November 12, 2024

doi:10.5430/jct.v13n5p292

URL: <https://doi.org/10.5430/jct.v13n5p292>

Abstract

This study examines the role of Innovation Diffusion Theory in enhancing the innovative behavior of lecturers in Indonesia's higher education system. In the context of rapid changes due to the Industrial Revolution 4.0 and the implementation of the Independent Curriculum, the need for innovation in teaching methods is critical. This research focuses on Project-Based Learning (PjBL) and Problem-Based Learning (PBL) as key innovative approaches. A total of 233 lecturers participated in the study, which employed structural equation model (SEM) to analyze the relationships between variables. The model is based on adaptation of the Theory of Planned Behavior (TPB), incorporating antecedents such as Image, Compatibility, Result Demonstrability, Voluntariness, and Visibility. The findings indicate that the developed structural model meets Goodness of Fit criteria, demonstrating strong influences from Visibility and Voluntariness on behavioral intention. However, other variables showed no significant impact. This research highlights the importance of fostering a supportive environment for innovation in higher education, suggesting that enhancing lecturers' motivation to innovate requires addressing both personal and institutional factors.

Keywords: innovation, diffusion theory, problem based learning, project based learning, education management

1. Introduction

Changes in the world of higher education today finally require universities to quickly change the way of thinking, attitudes, and behaviors and new ways of doing things for the academic community. The purpose of these demands is to produce graduates who are adaptive and resilient to change and uncertainty (Hero & Lindfors, 2019). Therefore, curriculum policies must be able to elaborate on the abilities of students which include pedagogic dimensions, life skills, collaboration skills, critical and creative thinking (Arif, 2022; Riccomini et al., 2019; Serdyukov, 2017). The increasingly heavy demands make higher education have to keep pace in various ways, both curriculum improvements and the selection of innovations in learning (Visvizi et al., 2018).

According to (Pinto-Santos et al., 2022), in recent years, the curriculum in universities has been degraded and less able to be oriented towards achieving the ability of students to understand science in the context of life skills competencies, the target only revolves around the target of achieving student competencies described in academic grades only. Today, humans need a way to be able to adapt to the changes caused by the industrial revolution 4.0. In fact, this industrial revolution era is running faster towards the industrial revolution 5.0. One must possess skills that machines cannot do, such as the ability to solve problems by thinking critically and creatively (Ramirez-Montoya, 2020; Zhuang & Liu, 2022). Demanding research (Santaolalla et al., 2020), the industrial revolution 4.0 fundamentally changed the way people live and work.

Education in all parts of the world has begun to change the concept of the curriculum carried. The concept of curriculum globally is changed massively due to the intense competition of high human resources in the 21st century. Research results (Moreno-Guerrero et al., 2020), stated that there are currently at least three great competencies in the 21st century, namely the competence to think, act, and live in the world. Thinking competencies include critical, creative, and problem-solving thinking. Acting competencies include communication, collaboration, digital literacy, and technological literacy. While the competence of living in the world includes initiative, self-direction, global understanding, and social responsibility (Konst (e. Penttilä) & Kairisto-Mertanen, 2020; Morad et al., 2021; Rahman

et al., 2020).

Massive curriculum changes also demand innovation in learning so that it can provide a better learning experience for students and can not only target knowledge for students but also some competencies that they must have to survive in this instant era. Currently in Indonesia, the Ministry of Education has changed the concept of curriculum with the Independent Curriculum. This curriculum change finally requires innovation in learning to support the success of the curriculum applied. One of the expected innovations is a change in the learning model that has been used, from teacher-centered learning to student-centered learning (Sofyan & Abdullah, 2022).

Various developed countries have begun to develop learning models that focus not only on memory knowledge, but how students have their own knowledge and thinking (Morad et al., 2021). Unfortunately, Indonesia is quite late to adopt this model so until now, there are still many teachers who use traditional learning models with dictating systems. According to (Rahman et al., 2020), before starting to innovate in learning, adaptation and adjustment of skills and competencies in educators and education personnel are needed. One of the objects of innovation in education must indeed focus on the learning process itself (Caliskan & Zhu, 2020; Gil et al., 2018; Gulden et al., 2020; Ramadan et al., 2021). Most universities regulate innovation in terms of learning that provokes creativity by provoking individual knowledge explicitly or implicitly (Schwabsky et al., 2020).

For 50 years, learning innovation in the USA has always been improved until finally getting a good education system today and can produce college graduates with a high level of critical thinking skills (Beck, 2017). Innovation in various countries is fully supported by teachers by applying various kinds of innovations in learning. However, this is not found in teachers in Indonesia. Lecturers in Indonesia are reluctant to innovate learning, one of which is because they see that seniors and other friends do not apply it (Stalheim, 2021). The teachers were complacent and already comfortable with the usual way of learning.

Diffusion of innovation is the spread of innovation carried out, especially in the digital era like this (Korhonen et al., 2022). Learning innovations are easy to implement and spread because technology facilitates all aspects, including education (Pérez-Sanagustín et al., 2022). The government recommends two learning models, namely: *Case methods* and *Project-based learning* Both of which are learning models focusing on students as the main actors in the class. Both models play an active role in building student character. The value of responsibility is the main milestone in both models, both the responsibility of the lecturer to continue to accompany students as facilitators and the responsibility of students to learn independently and in groups. The importance of this research is more deeply contained in the meaning of awakening innovation behavior with rules to build the value and character of the academic community. In the face of an increasingly fierce world of work, college graduates must be equipped with strong values and character to maintain their position so as not to be eliminated by technology.

Etymologically, diffusion means the spread and clearing of something from one party to another (Dearing & Cox, 2018), while innovation means something new or renewal (Frei-Landau et al., 2022). The diffusion of educational innovation in this study can be interpreted as a communication process to provide an understanding in the field of education to the social system or society that lasts all the time in order to achieve a common understanding that can be accepted among the community that can help improve learning for the community.

Theory of planned behavior According to (Ajzen et al., 2011), *Theory of Planned Behavior* is a theory used to predict that a person's behavior will arise because of the intention to behave. A person's intention to behave can be predicted by three things: *attitude toward behavior* which is the entirety of an individual's evaluation of his or her positives and negatives to display a particular behavior, then there is *subjective norm* which is an individual's beliefs about the demands of others who are considered important to him or her and are willing to display certain behaviors, and lastly *perceived behavioral control* which is a person's perception of the ability to display a certain behavior. *Theory of planned behavior* In this study, it is more about assessing a person's behavior to want to diffusion educational innovations, especially in the field of learning in this developing era.

Based on the literature building compiled in this study, the research framework in the first stage will describe the pattern of relationships created by the theory of innovation diffusion in influencing the feelings of lecturers in terms of acceptance or rejection of behavior to start innovating in learning. In the second stage, this research will dig deeper into the relationship of behavioral theory built between variables so that it can interpret lecturer behavior to take action to innovate in learning. Behavioral intention mediates because the act of initiating learning innovation will begin with the presence of intention in behavior. The relationship between variables and also the hypothesis can be explained as follows.

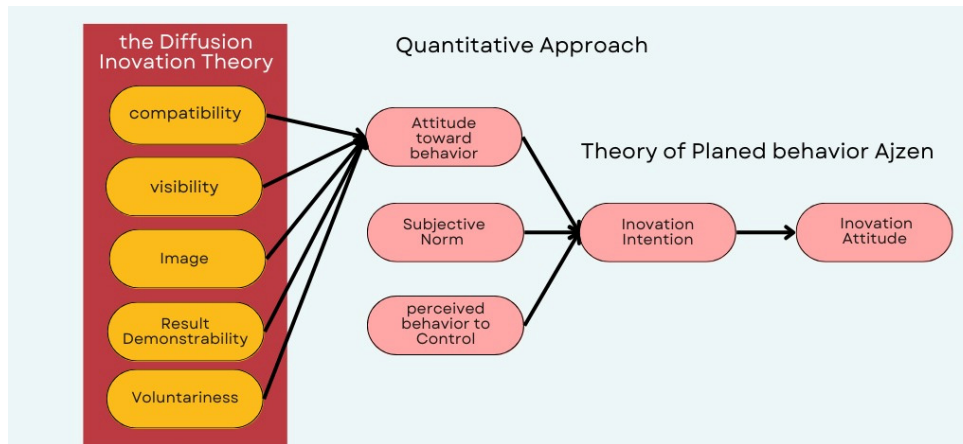


Figure 1. Research Model

2. Research Methods

This research develops a conceptual model of educational innovation in the field of learning which is directed at two existing models, namely *case methods and project-based learning* by utilizing technology as the main deployment and application of learning model innovation. First, this study develops two theories, namely innovation diffusion theory and behavioral theory to see lecturer behavior in conducting learning innovations, and then quantitative data on innovation behavior will be reprocessed as qualitative instruments to develop learning model innovations that are diffused with technology and can be applied. This research model refers to Rogers' theory of diffusion of innovation and the *theory of planned behavior* developed by Ajzen. The construct of the theory model is used as a variable, so this study has *compatibility, visibility, image, result demonstrability, voluntariness, attitude towards behavioral, subjective norms, perceived behavioral, behavioral intention, and behavioral*.

The population for this study comprises 660 lecturers from various Indonesian universities specializing in economic education. A sample of 233 lecturers was selected using the Slovin formula to ensure adequate representation. Participants were chosen based on their experience with innovative teaching methods, providing a diverse perspective on the implementation of PJBL and PBL. Data were collected through structured questionnaires distributed online. The questionnaire included items designed to assess the lecturers' attitudes towards innovation, perceived behavioral control, and subjective norms, aligned with the constructs of the Theory of Planned Behavior. Quantitative data were analyzed using Structural Equation Modeling (SEM) with the aid of Partial Least Squares (PLS) software. This approach allowed for the evaluation of the relationships between the variables, testing the proposed hypotheses within the model. A mixed-methods design was employed, where qualitative insights from key informants further validated the quantitative findings, enhancing the robustness of the research.

3. Results and Discussion

3.1 Results

The main objective in this study is to build a structural model of the intentions of lecturers in Indonesia in innovating PJBL and PBL learning. Hair, et.al (2014) explained that causal research using PLS can emphasize the final results to find out 1) Model Construction 2) conduct outer analysis to identify factors that are constructs in a variable, 3) Inner model analysis.

3.2 Outer Model Analysis

The outer model analysis aimed to determine the accuracy of the constructs constituting the variables in the model. Convergent validity testing assessed the outer loading of observed variables into latent variables. An indicator is deemed satisfactory if the outer loading value exceeds 0.7 (Hair et al., 2014). Initial analysis revealed that all constructs demonstrated loading values greater than 0.7, indicating robust representation of the variables.

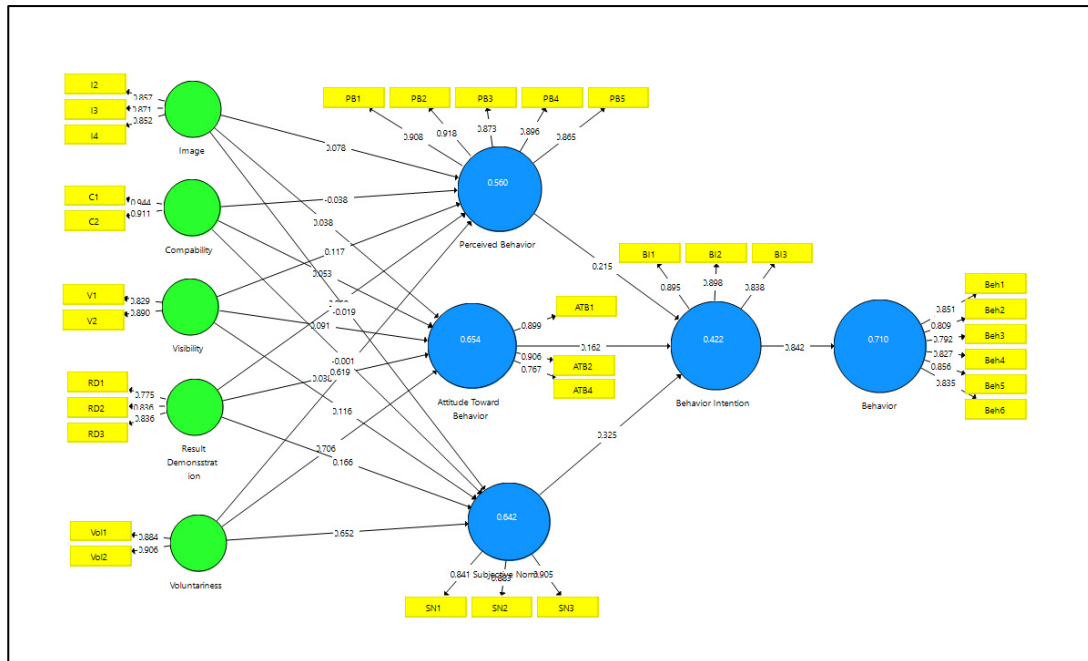


Figure 2. Outer Model

In the model, it is known that all constructs that compose variables have a loading value of > 0.7 which indicates that the constituent items of the variable are items that can represent variables.

3.3 Construct Reliability and Validity

Reliability testing confirmed that all variables met the required Cronbach's Alpha criteria of >0.7, indicating ideal reliability. Furthermore, the Average Variance Extracted (AVE) values also met the necessary criterion of >0.5, signifying that the indicators effectively represented their corresponding latent variables.

Table 1. Construct Validity and Reliability

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Attitude Toward Behavior	0,825	0,860	0,895	0,740
Innovation Behavior	0,909	0,911	0,929	0,687
Behavior Intention	0,850	0,851	0,909	0,770
Compatibility	0,840	0,871	0,925	0,861
Image	0,825	0,829	0,895	0,740
Perceived Behavior	0,936	0,937	0,951	0,796
Result Demonstration	0,753	0,773	0,857	0,666
Subjective Norm	0,849	0,850	0,909	0,769
Visibility	0,701	0,709	0,850	0,740
Voluntariness	0,751	0,756	0,889	0,801

Source: data processed in 2023

In the table it is explained that the value of Cronbach's Alpha shows that all variables arranged meet the required criteria of >0.7, this shows that the reliability of all indicators in the model is ideal. Furthermore, the AVE value also meets the required criteria of >0.5 which indicates that a set of indicators represents one latent variable and the underlying latent variable.

Furthermore, in the Fit Model test, it can be seen that the model designed to determine the intentions of business

actors towards green marketing is stated in accordance with empirical construction in the field. This can be seen from the Fit value of the model which shows the value of SMRS = 0.093 < 0.10.

3.4 Hypothesis Testing

Hypothesis testing was conducted by evaluating the P-values for each relationship in the proposed model. A P-value of < 0.05 indicated significant relationships. The findings suggested that the variables of Attitude Toward Behavior, Subjective Norm, and Voluntariness significantly influenced Behavioral Intention, while Compatibility, Image, and Result Demonstrability did not exhibit significant effects.

Table 2. Model Iner Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Attitude Toward Behavior -> Behavior Intention	0,711	0,746	0,021	18,068	0,008
Behavior Intention -> Behavior	0,842	0,842	0,032	26,066	0,000
Compability -> Attitude Toward Behavior	0,053	0,054	0,056	0,945	0,345
Image -> Attitude Toward Behavior	0,038	0,040	0,072	0,534	0,594
Perceived Behavior -> Behavior Intention	0,215	0,188	0,140	1,537	0,125
Result Dmonsstration -> Attitude Toward Behavior	0,038	0,047	0,088	0,430	0,668
Subjective Norm -> Behavior Intention	0,325	0,322	0,132	2,457	0,014
Visibility -> Attitude Toward Behavior	0,091	0,093	0,056	1,635	0,103
Voluntariness -> Attitude Toward Behavior	0,706	0,698	0,055	12,866	0,000

Source: data processed in 2023

4. Discussion

4.1 Compatibility to Attitude Toward Behavior

The findings of this study indicate that the variable of compatibility did not have a significant impact on attitudes toward innovative behavior, with a P-value of 0.345. This result challenges the prevailing assumption that a higher degree of compatibility between an innovation and an individual's existing values would inherently lead to more favorable attitudes toward its adoption.

Previous literature has frequently emphasized the importance of compatibility as a key determinant in the diffusion of innovations. According to Korhonen et al. (2022), innovations that align well with the values, beliefs, and needs of potential adopters are more likely to be accepted and integrated into practice. This notion is based on the premise that individuals are inclined to embrace changes that resonate with their established frameworks and experiences. However, the results of this study suggest a more nuanced understanding of how compatibility influences attitudes toward innovation among lecturers in Indonesian higher education.

Despite the expectation that compatibility would foster positive attitudes, the data reveal that this variable alone is insufficient to drive innovative behavior. Other elements appear to be at play, complicating the relationship between compatibility and attitudes. For instance, the perceived benefits of adopting an innovation may overshadow the importance of compatibility. Lecturers may recognize that while an innovation aligns with their pedagogical values, they might question its practical effectiveness or relevance to their teaching contexts. If lecturers perceive that an innovation does not yield tangible improvements in learning outcomes or student engagement, their initial compatibility with the innovation may become irrelevant.

Additionally, the influence of institutional support cannot be overlooked. A supportive environment, characterized by encouragement from administration and colleagues, can significantly enhance lecturers' willingness to adopt innovations, even when those innovations are not entirely compatible with their existing practices. Research by Santaolalla et al. (2020) supports this notion, highlighting that organizational backing plays a critical role in fostering positive attitudes toward innovative teaching methods. When lecturers feel supported by their institutions, they are more likely to experiment with new approaches, regardless of their initial compatibility with personal values.

Within the framework of this study, it can be seen that the extent to which the level of conformity of innovation with the values, beliefs, and needs of lecturers, these factors do not directly have a significant influence on lecturers'

attitudes towards the adoption of innovative behavior (Stalheim, 2021). Although lecturers who have innovations that are highly relevant to the learning context in Indonesia may have strong potential, they often face challenges that limit the implementation of such innovations.

Moreover, it is essential to consider the impact of external pressures and constraints that lecturers face in their professional environments. Many educators in Indonesia contend with heavy administrative workloads and limited resources, which can create significant barriers to adopting new teaching methods. Even when an innovation is perceived as compatible, practical challenges may deter lecturers from implementation. This situation reflects a broader issue within the educational landscape, where systemic factors often inhibit innovation, irrespective of individual attitudes.

In light of these findings, it becomes evident that compatibility, while an important factor, is insufficient by itself to predict innovative behavior among lecturers. Future research should delve deeper into the complex interplay of compatibility with other contextual variables, such as perceived usefulness, social influence, and institutional support. By examining these relationships, researchers can develop a more comprehensive understanding of what drives innovation in higher education settings.

4.2 Visibility to Attitude toward Behavior

The analysis shows that the visibility variable did not have a statistically significant impact on attitudes toward innovative behavior, with a P-value of 0.103. This finding suggests that although visibility is often assumed to enhance the adoption of innovations, it may not always play a decisive role in shaping individual attitudes. Previous research by Somech & Khotaba (2017) noted that visibility can amplify the attractiveness of an innovation, as individuals are more inclined to adopt practices that are well-known or widely acknowledged. However, the current study reveals that the relationship between visibility and attitude toward behavior is more complex, particularly in the context of higher education.

In theory, visible innovations are expected to encourage adoption, as they provide social validation and reduce uncertainty. However, these assumptions do not always hold in educational environments. The findings align with research by Caliskan & Zhu (2020), which emphasized that visibility alone may not lead to meaningful changes in behavior. In many cases, lecturers may acknowledge the visibility of an innovation but remain unconvinced about its practical relevance or applicability in their teaching context. For example, while the case method or project-based learning may be widely promoted, lecturers might hesitate to adopt these approaches if they feel that the innovation does not fit their teaching style or student needs.

Additionally, visibility can create unintended pressures that discourage adoption. When an innovation becomes highly visible, lecturers may feel scrutinized by peers or administrators, leading to concerns about the risks of experimentation. This dynamic can limit their willingness to engage with visible innovations, particularly if they fear potential criticism or failure. Zhuang & Liu (2022) observed that excessive visibility can result in unrealistic expectations and social pressures, which, instead of fostering positive attitudes, may create resistance to change.

The findings also highlight the importance of the perceived benefits and practical support associated with visible innovations. As previous studies suggest, lecturers are more likely to adopt innovations when they perceive clear benefits and have access to sufficient support (Santaolalla et al., 2020). In the absence of such support, visibility may become irrelevant to the decision-making process. Lecturers might recognize an innovation's prominence but choose not to engage with it due to a lack of institutional encouragement or professional development opportunities. Furthermore, social support from peers plays a pivotal role in shaping attitudes toward innovative behavior. Research by Caliskan and Zhu (2020) found that when lecturers perceive strong peer support, they are more likely to adopt innovations, even if those innovations are not immediately visible. This finding underscores the importance of fostering a collaborative environment where lecturers feel supported in their efforts to innovate, rather than relying solely on the visibility of new practices.

4.3 Image to Attitude toward Behavior

From the test results that have been analyzed, it can be seen that the image variable towards attitudes towards innovative behavior has a p value of 0.594. These results indicate that statistically, image does not have a significant influence on attitudes towards innovative behavior. This discovery encourages us to explore the factors that may underlie this phenomenon, and one potential reason is the gap between the image perceived by lecturers and the reality they perceive in engaging in innovative behavior.

The discrepancy between the perceived image of the lecturer and the perceived reality of innovating could be an important factor in explaining why the image does not have a significant impact on attitudes towards innovative

behavior. Sometimes, the positive or negative image that lecturers have of an innovation may not fully reflect the real experience they have in adopting innovative behavior (Dearing & Cox, 2018). Innovations that have a positive image may not always bring the positive impact expected by lecturers in practice, and conversely, innovations that receive a negative image may have unexpected benefits or positive outcomes.

Research conducted by (Pérez-Sanagustín et al., 2022) shows that lecturers' perceptions of innovation images can be influenced by various factors, including interactions with peers and information received. The image of an innovation can be formed by interaction with colleagues who have different views, as well as information received from various sources. Therefore, when image does not have a significant influence on attitudes towards innovative behavior, it may indicate a discrepancy between perceptions shaped by social interaction and information, and the reality experienced by lecturers in the face of challenges and the real impact of innovation adoption.

This research has led to an understanding that the role of image can be significant if it is supported by strong social norms in support of innovative behavior. These findings are consistent with the views put forward by (Morad et al., 2021) in his research, which also found that factors such as perceptions of benefits and barriers, as well as social norms, had a more dominant influence in influencing lecturers' innovative behavior compared to image.

The presence of strong social norms can reinforce the influence of image on innovative behavior. When an innovation has a positive image and is well accepted by social norms in an academic environment, lecturers tend to feel more encouraging to adopt innovative behaviors. Strong social norms can create positive pressure and collective encouragement for lecturers to actively participate in innovative practices, regardless of their perception of image.

4.4 Result Demonstrability to Attitude toward Behavior

Through analysis of test results, it was found that the variable result demonstrability towards attitudes towards innovative behavior had a p value of 0.668. This p-value number indicates that statistically, result demonstrability does not have a significant influence on attitudes towards innovative behavior. However, the understanding of the impact of these findings becomes more profound when viewed in the context of educational environments, where the results of innovation may not always be clearly or quickly measurable.

In an educational environment, many innovations have results that may not be easily or directly measurable. Sometimes, the impact of an innovation can take longer to observe or measure quantitatively. This can happen in situations where the results of an innovation proposed by a lecturer may require several learning cycles to be seen significantly, or the impact will only be felt over a longer period of time (Campos et al., 2020).

In this context, vagueness in measuring the results of innovation is one of the factors that influence the way lecturers form attitudes towards innovative behavior. Lecturers may face challenges in providing clear and measurable evidence of the effectiveness of an innovation to themselves, colleagues, or even students. This uncertainty can lead to uncertainty in adopting innovative behaviors, especially if the results cannot be seen or measured easily.

Research conducted by (Wilson & Sy, 2021) indicates that strong support from organizations and work environments has the potential to increase innovation adoption among lecturers. These findings imply that when the work environment encourages innovation and provides adequate support to see results from innovation, the role of result demonstrability may have a stronger influence. However, there are aspects to consider that can limit the effect of result demonstrability in certain situations.

In this context, if the work environment does not provide a clear impetus to adopt innovation or does not provide a supportive infrastructure, then the impact of result demonstrability may be limited. An environment that does not provide space to observe the results of innovation or that is less supportive in adopting innovative behaviors can make lecturers feel less motivated to involve themselves in innovative processes. In cases like this, result demonstrability may not have a significant effect because lecturers feel less likely to see the results of their innovations recognized or appreciated.

4.5 Voluntariness to Attitude Toward Behavior

The findings reveal that voluntariness has a significant positive impact on attitudes toward innovative behavior, with a P-value of 0.000. This result underscores the importance of the perception of freedom and control in adopting innovative practices. When lecturers feel that they voluntarily choose to adopt new methods without coercion, their attitudes toward such innovations become more favorable. These findings align with the observations of Bervell et al. (2022), who noted that the sense of voluntariness in adopting learning technologies plays a crucial role in shaping teachers' attitudes toward integrating new practices.

Voluntariness reflects the degree to which individuals perceive that they have autonomy in deciding whether to

engage in innovative behavior. This is particularly relevant in academic contexts, where autonomy is highly valued. Lecturers who feel that they have the freedom to experiment with new teaching methods are more likely to develop positive attitudes toward innovation. This autonomy fosters a sense of personal responsibility and ownership over the innovation process, encouraging deeper engagement with the new practices (Kwangmuang et al., 2021). Moreover, voluntariness reduces the psychological resistance often associated with mandated change. When innovation is imposed by external forces, such as institutional policies or administrative directives, lecturers may perceive it as a burden, leading to negative attitudes. In contrast, voluntary adoption allows lecturers to align innovations with their teaching goals and personal values, enhancing their willingness to experiment with new practices. These findings support the notion that autonomy and self-determination are essential for fostering a positive attitude toward innovation (Zogheib, 2019).

Institutional support also plays a crucial role in reinforcing voluntariness. When educational institutions create an environment that encourages voluntary engagement with new practices, lecturers are more likely to feel motivated to innovate. This support can come in the form of professional development opportunities, recognition for innovative efforts, and the provision of resources necessary for experimentation. Without such support, even voluntary innovation can become a daunting task, diminishing positive attitudes toward new practices (Alhammadi et al., 2023). Voluntariness is a key factor in shaping positive attitudes toward innovative behavior among lecturers. Educational institutions should focus on creating an environment that promotes autonomy while also providing meaningful support. By fostering voluntariness and minimizing external pressure, institutions can encourage lecturers to engage in innovative practices with enthusiasm, ultimately contributing to improved teaching outcomes and a culture of continuous learning.

4.6 Attitude Toward Behavior to Innovation Behavior Intention

The results demonstrate that attitude toward behavior has a significant positive effect on innovation behavior intention, with a P-value of 0.008. This finding aligns with the Theory of Planned Behavior (Ajzen et al., 2011), which asserts that individuals with favorable attitudes toward a specific action are more likely to develop intentions to perform that action. In the context of this study, lecturers who perceive innovative teaching methods as beneficial and consistent with their values are more inclined to adopt these methods.

A positive attitude reflects the subjective evaluation of the value, relevance, and advantages of innovation. Lecturers with favorable attitudes toward innovation tend to recognize the benefits of using innovative approaches, such as improved student engagement and learning outcomes. These attitudes also stem from the perceived alignment between innovative practices and the lecturers' teaching philosophies. According to Wilson & Sy (2021), positive attitudes act as powerful motivators, encouraging individuals to explore and implement new teaching strategies. The findings also emphasize the role of attitudes in overcoming barriers to innovation. Even when challenges, such as administrative workload or limited resources, are present, a positive attitude can foster resilience and determination to innovate. This observation is consistent with previous studies showing that individuals with strong positive attitudes are more likely to persist in adopting new practices despite external challenges (Yuen et al., 2021).

Moreover, attitudes toward behavior play a mediating role in the relationship between subjective norms and behavior intention. Lecturers who feel encouraged by peers and institutions to innovate are likely to develop more positive attitudes toward innovative practices, reinforcing their intentions to adopt these methods. This interplay highlights the importance of fostering not only favorable attitudes but also a supportive environment that strengthens those attitudes (Schwabsky et al., 2020). The findings underscore the central role of attitudes in shaping innovation behavior intention. Educational institutions should focus on promoting positive attitudes toward innovation by providing training, recognizing efforts, and demonstrating the tangible benefits of new teaching methods. Such initiatives will enhance lecturers' intentions to adopt innovative practices, contributing to a more dynamic and effective learning environment.

4.7 Perceived Behavior to Innovation Behavior Intention

The analysis shows that perceived behavior did not have a statistically significant impact on innovation behavior intention, with a P-value of 0.125. This finding suggests that individual perceptions regarding the ease of use and effectiveness of an innovation alone are not sufficient to drive the intention to adopt innovative practices. According to the Theory of Planned Behavior (Ajzen et al., 2011), perceived behavior refers to an individual's belief about the feasibility of performing a certain behavior, considering both personal abilities and external resources. Although this factor is generally considered influential, the results of this study reveal its limited effect within the context of Indonesian lecturers.

One possible explanation for this outcome is the presence of external constraints, such as institutional barriers or resource limitations, which may diminish the influence of perceived behavior. Even if lecturers believe that they have the skills to implement an innovation, they may feel discouraged by the lack of institutional support or inadequate resources. These findings align with previous studies by Visvizi et al. (2018) and Nowell et al. (2020), which suggest that perceived behavioral control may not translate into behavioral intention if organizational support is weak.

Another factor influencing this result could be the role of social norms within academic settings. Lecturers may perceive that even though they are capable of adopting new practices, the absence of peer support or encouragement from leadership reduces their motivation to innovate. Research by Chandra et al. (2020) highlights that social perceptions and the recognition of innovative efforts by colleagues play a crucial role in reinforcing behavior intentions. If lecturers feel that their efforts will go unnoticed or unappreciated, their motivation to act on perceived behavioral control diminishes.

Additionally, the complexity of innovation adoption in educational settings might contribute to these findings. Many innovations in teaching require more than individual effort; they demand collaboration and institutional alignment. Lecturers may perceive that their personal ability to innovate is not enough unless supported by broader institutional frameworks. As a result, even positive perceptions about innovation do not always lead to strong intentions to act on them. While perceived behavior is a relevant factor, it does not significantly influence innovation behavior intention in this study. To enhance lecturers' intention to innovate, educational institutions must focus on strengthening social support, aligning institutional policies, and ensuring adequate resources. This comprehensive approach will bridge the gap between individual capacity and actionable intention, fostering a more conducive environment for innovation.

4.8 Subjective Norm to Innovation Behavior Intention

The results indicate that subjective norms have a significant positive effect on innovation behavior intention, with a P-value of 0.014. This finding aligns with the Theory of Planned Behavior (Ajzen et al., 2011), which emphasizes the influence of perceived social pressure on individuals' intention to perform specific behaviors. In this context, subjective norms reflect the expectations and encouragement from peers, superiors, or other significant individuals toward adopting innovative practices in teaching.

Lecturers are more likely to develop intentions to innovate when they perceive that important people around them—such as colleagues, department heads, or academic leaders—support the adoption of new teaching methods. This aligns with research by Ramirez-Montoya (2020), which found that social expectations within academic environments play a critical role in shaping attitudes and intentions toward innovation. Social support helps reduce uncertainties surrounding innovation, encouraging lecturers to experiment with new methods despite potential challenges.

Moreover, subjective norms also create a sense of accountability and shared responsibility among lecturers. When peers actively promote and engage in innovative behavior, it generates a collective expectation that motivates others to follow suit. Stalheim (2021) noted that when academic environments foster a culture of innovation, the influence of subjective norms on behavior intention becomes even stronger. Lecturers are more likely to conform to these social expectations when they see innovation as a norm rather than an exception.

However, the impact of subjective norms can also depend on the level of institutional support provided. Even when lecturers feel social pressure to innovate, the absence of adequate resources or recognition can diminish their motivation to follow through. In such cases, the positive influence of subjective norms may be undermined by external constraints, such as high workloads or limited professional development opportunities (Capacio et al., 2021). Subjective norms play a vital role in shaping lecturers' intention to adopt innovative practices. Educational institutions can strengthen the impact of subjective norms by fostering collaborative environments, encouraging peer support, and providing recognition for innovative efforts. When social expectations are reinforced by institutional support, lecturers are more likely to develop strong intentions to innovate, contributing to the continuous improvement of teaching practices.

4.9 Innovation Behavior Intention to Innovation Behavior

The results confirm that innovation behavior intention has a strong positive effect on actual innovation behavior, with a P-value of 0.000. This finding aligns with the core premise of the Theory of Planned Behavior (Ajzen et al., 2011), which posits that an individual's intention is the most immediate predictor of their actual behavior. In the context of this study, lecturers with high innovation behavior intentions are more likely to engage in innovative teaching

practices, such as adopting Project-Based Learning (PJBL) or Problem-Based Learning (PBL).

Behavioral intentions represent the level of motivation and commitment an individual has toward performing a certain action. Lecturers who express a strong intention to innovate tend to demonstrate persistence in overcoming challenges and implementing new methods. As noted by Putro et al. (2022), high behavioral intention can help individuals navigate obstacles, such as workload pressures or institutional barriers, ensuring that their goals translate into action. This persistence is particularly critical in the dynamic landscape of higher education, where innovation often requires continuous effort and adaptation.

Moreover, the alignment between intention and behavior underscores the role of psychological readiness in driving innovation. Lecturers with strong innovation intentions are more likely to experiment with new practices, even in uncertain or resource-constrained environments. Somech & Khotaba (2017) emphasize that intention serves as a bridge between positive attitudes and actual behavior, helping individuals translate their internal motivation into tangible actions. When lecturers believe in the value of innovation and commit to it, they are more likely to implement these practices in their classrooms.

However, it is important to recognize that external support also plays a key role in sustaining innovation behavior. Even with strong intentions, lecturers may struggle to maintain innovative practices without adequate institutional backing, professional development, or peer collaboration (Caliskan & Zhu, 2020). A supportive environment ensures that innovation behavior becomes consistent and sustainable over time. The results highlight the pivotal role of behavior intention in predicting innovation behavior. Educational institutions should focus on enhancing lecturers' intentions by fostering positive attitudes, providing resources, and recognizing innovative efforts. These strategies will help bridge the gap between intention and behavior, ensuring that innovative practices become embedded in everyday teaching.

5. Conclusion

In examining the factors that influence the innovative behavior of lecturers, various variables such as attitudes towards behavior, subjective norms, innovative behavior intentions, and contextual factors such as organizational support, barriers, and social norms have a central role in shaping the acceptance and implementation of innovation. Attitudes toward innovative behavior reflect lecturers' subjective assessment of the merits and consistency of innovative behavior with their values and goals. The intention of innovative behavior, which is influenced by motivational factors and subjective norms, becomes a bridge between attitudes and real behavior. Lecturers with strong intentions tend to overcome obstacles and implement innovations.

Furthermore, social and environmental influences are very important in the process of acceptance of innovation. Subjective norms, which reflect the influences and expectations of others, have been shown to influence the intentions of innovative behavior. A supportive work environment and positive social norms can reinforce the influence of intention on real behavior. Contextual factors such as barriers and organizational support can also modify the relationship between those variables.

The acceptance of innovation among lecturers is the result of a complex interaction between psychological, social, and contextual factors. A holistic approach is needed in designing strategies to encourage innovative behavior. Promoting positive attitudes towards innovation, reinforcing supportive subjective norms, and designing supportive work environments are important steps in driving innovation adoption. Also, overcoming obstacles and maximizing organizational support will help translate intent into action. By understanding the factors influencing the innovative behavior of lecturers, educational institutions can formulate effective strategies to facilitate positive change in adopting and implementing innovations.

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Acknowledgments

We would like to express our sincere gratitude to the Universitas Negeri Semarang for their support. Special thanks are also extended to all lecturers in Indonesia who participated in this study and provided valuable insights.

Authors contributions

Prof. Kardoyo was responsible for study design and revising. Feriady was responsible for data collection. Lola drafted the manuscript and revised it. All authors read and approved the final manuscript. In this paragraph, also explain any special agreements concerning authorship, such as if authors contributed equally to the study.

Funding

This research was funded by the Institute for Research and Community Service (Lembaga Penelitian dan Pengabdian kepada Masyarakat, LPPM), Universitas Negeri Semarang, Indonesia.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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