



## TRANSFORMING LEARNING CULTURE FOR SUSTAINABLE DEVELOPMENT: EVIDENCE FROM UNIVERSITY STUDENTS AT INDONESIA

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### ABSTRACT

**Phenomenon/Issue:** Digital technology development has transformed learning methods and interaction patterns of students. This drives learning culture transformation in higher education not only by technological adoption, but also by students' internal readiness to manage their own learning processes.

**Purpose:** This study examines the factors influencing the transformation of learning culture among students in the Office Administration Education Study Program at Universitas Negeri Surabaya to identify the most significant factors driving this transformation in order to support the achievement of Sustainable Development Goal 4 (SDG 4).

**Novelty:** This study contributes a novel perspective by examining multiple causal factors driving the transformation of student learning culture, rather than focusing solely on technology.

**Research Methods:** This study used quantitative methodology with Principal Component Analysis (PCA) for five variables: digital literacy, self-efficacy, self-regulated learning, perceived ease of use, and personal motivation.

**Results:** The results show that the five variables form one main component, with self-regulated learning as the most dominant factor, while personal motivation, particularly the relatedness indicator, had the lowest contribution.

**Research Contributions:** These findings underscore the necessity of balancing self-regulation, the utilization of digital technology, and the enhancement of social ties in improving students' learning culture.

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## INTRODUCTION

Digital technology has expanded education beyond traditional limits of time and space while creating more sustainable learning environments over the past twenty years (Wang et al., 2024). These rapid advancements have reshaped many sectors, including education in developing countries (Bora Ly et al., 2024). In recent years, advances in digital technology have shifted the way humans interact with information, culture, and, of course, the educational process (Hasnida et al., 2023). In the era of the Industrial Revolution 4.0 and now entering the era of society 5.0, education is required to align itself with the rapidly developing technological advances. This is carried out to produce skilled and flexible human resources and experts in competing globally (Teknowijoyo & Marpelina, 2022). In this era of globalization, learning's application in the field of education has changed the implementation of modern learning, which utilizes advances in information and communication technology (ICT), for instance, using the internet (Sari & Ranu, 2019), reflecting a broader shift from conventional to digitally oriented learning cultures (Sabathani et al., 2021).

Learning culture is a dynamic set of habits that evolves, shaping effective educational environments for individuals, professional communities, and organizations (Nogina et al., 2024). As it changes, learning culture has increasingly shifted toward more learner-centered and inclusive approaches, supported by digital technology (Kharis et al., 2024). Before the digital era, higher education largely relied on teacher-centered methods, where lecturers served as the primary source of knowledge and students played passive roles in lecture-dominated classes with limited interaction (Klein et al., 2023). In addition, conventional learning is usually carried out using simple media such as textbooks, whiteboards, and handouts, as well as the habit of reading texts and writing notes manually (Dietrich & Evans, 2022).

Vallo Hult et al. (2025) argued that transforming learning culture involves integrating digital tools and platforms to enhance educational experiences, improve learning outcomes, and increase all effectiveness. Hasnida et al. (2023) also explained that technological advances have given rise to a new paradigm in the learning process, shifting from a conventional learning culture to a system that relies on digital technology as the primary tool. What initially involved taking notes in books, reading from printed sources, and having direct discussions in the classroom is now being replaced by new, more dynamic, digital-based habits. The benefits of digital technology in education are evident in its capacity to make learning more flexible, adaptive, and student-centered. Santos-Meneses et al. (2023), found that technology enables students to access educational resources anytime and anywhere, offering greater flexibility and supporting independent learning.

This study builds on Kharis et al. (2024), Singh & Martolia (2024), Bora Ly et al. (2024) and Abbas et al. (2019) each of which contributes to understanding the transformation of learning culture in higher education. Kharis et al. (2024) examine the role of artificial intelligence (AI) in improving learning quality and supporting the achievement of SDG 4, while Singh & Martolia (2024) highlight the contribution of utilizing digital tools to improving the inclusivity and quality of higher education within the framework of achieving SDG 4. On the other hand, Bora Ly et al. (2024) used an integrated theoretical approach to investigate the elements influencing university students' adoption of digital learning. Meanwhile, Abbas et al. (2019) analyzed the positive and negative effects of social media use on students' learning behavior in continuing education.

Previous studies have primarily focused on the impact, acceptance, and use of specific technologies, as well as their effects on students' academic achievement. Most examined the effectiveness of particular digital tools rather than the broader transformation of students' learning culture. Moreover, limited attention has been paid to the underlying factors driving this transformation. Recognizing this gap in previous research, this study offers a novel contribution by identifying and analyzing the causal factors driving the transformation of students' learning culture, rather than limiting its focus to a single aspect of technology.

Based on observations in several classes and cohorts in the Office Administration Education Study Program at Universitas Negeri Surabaya, students have experienced changes in their learning culture.

They increasingly rely on digital technologies such as artificial intelligence, learning applications, social media, and personal devices to complete assignments and understand course material. Rather than depending solely on printed textbooks and face-to-face lectures, students now actively seek and access resources through various digital platforms. Interviews with students support these observations, showing that they perceive technology as more practical and efficient. This fosters their academic and creative development.

Transforming learning culture is essential to advancing SDG 4, which promotes inclusive, sustainable, and adaptive education in the digital era. The transformation of learning culture that occurs among students, from conventional methods to the use of digital learning technology, reflects a real step in supporting the global agenda of SDG 4. Consequently, it's critical to recognize and comprehend the several elements that contribute to this transformation so that higher education in Indonesia is not only responsive to technological developments, but also contributes to achieving quality education as mandated in SDG4.

This study examines internal factors that may drive the transformation of learning culture, including digital literacy, self-efficacy, self-regulated learning, perceived ease of use, and personal motivation. It aims to identify the internal variables influencing the shift in learning culture among Office Administration Education students at Universitas Negeri Surabaya. The data in this study are limited to individual internal factors that influence the transformation of learning culture from conventional methods to the application of digital technology. This study also does not discuss the impact of technology on academic grades, but only focuses on changes in learning habits.

## LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### Theory of Adoption and Diffusion of Innovation

The Diffusion of Innovations Theory, proposed by Everett M. Rogers (1983), explains how an innovation is communicated and adopted within a social system. In this context, innovation refers to new ideas, practices, or technologies such as the shift from conventional to digital learning in higher education. According to Everett M. Rogers (1983:5), diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Innovation involves the integration of digital technology into students' learning culture, disseminated through various channels, including lecturers, digital media, and peer networks.

### Behaviorism Theory

Behaviorism, introduced by John B. Watson in 1913, views learning as a change in observable behavior resulting from interactions between stimulus and response. In this perspective, learning occurs when individuals develop new behavioral patterns through repeated responses to specific stimuli (Hamruni et al., 2021). Behaviorism theory in this study explains changes in student learning behavior as part of the transformation of learning culture. This transformation can be influenced by external stimuli, namely technology-based learning environments such as actively accessing online materials, completing digital quizzes, or discussing in online forums.

### Learning Culture

According to Ralph Linton (1936), in *The Study of Man*, culture is a pattern of learned behavior and its outcomes, sustained and transmitted by members of a society. Meanwhile, Koenjtaraningrat (1993), an Indonesian anthropologist, explains that culture consists of the entire system of thoughts and feelings, behaviors, and creations that emerge from humans in the context of social life and are then claimed as their own through learning.

Through their research, Abante et al. (2023) define learning as the process of acquiring knowledge, skills, and values through study and experience, leading to changes in understanding, attitudes, and behavior. Meanwhile, according to Slameto (1998) Learning is the process by which people work to alter their behavior in new and comprehensive ways as a result of their interactions with their environment.

Individuals in a learning culture demonstrate enthusiasm, curiosity, and discipline in engaging with the learning process. Learning culture contains the patterns, beliefs, and norms that shape how students participate in educational activities (Kim, 2020). Through their research, Muslikh & Deviastry (2020) define learning culture as the process of shaping individual beliefs, behaviors, and values. Thus, the term "learning culture" applies to this study a series of habits, behaviors, and learning methods that develop within a community, whether formed individually or in groups. These activities are repeated and become an essential component of education. Learning culture is not only formed by individual or group learning habits but is also greatly influenced by the environment, institutional policies, and motivation derived from the support of educators.

### **Differences between Conventional and Modern Learning Culture**

Changes in teaching strategies have reshaped the way students and teachers interact, creating new dynamics in the learning process. Effective communication between teachers and students remains essential for successful learning (Mojumder et al., 2025). Conventional learning is characterized by a verbal and largely impersonal teaching and learning process, with the delivery of subject matter still relying on lectures (Narpila et al., 2025). Terminologically, this conventional learning culture refers to a system in which the teacher serves as the primary source of knowledge (Sakholid Nasution, as cited in Narpila et al., 2025).

In contrast, a modern or digital learning culture is more student-centered, placing learners' needs and interests at the core of the process. It emphasizes engagement, collaboration, and autonomy, aiming to create a supportive and challenging environment aligned with students' goals (Kerimbayev et al., 2023). Thus, digital platforms for education have emerged, offering a variety of innovative and flexible learning solutions (Purike & Aslan, 2025). In contrast to traditional learning cultures, one way to characterize contemporary or digital learning cultures is as educational approaches where hardware and software technology enable learning by offering learning that is not limited by time or location (Hopcan et al., 2023; Alhabeeb & Rowley, 2018).

### **Digital Transformation in Learning Culture**

According to Karanasios (as cited in Pettersson et al., 2024) digital transformation in education is not simply the application of new technologies but also encompasses profound social and cultural changes in the learning environment. Başar & Şahin (2022) argue that the digital transformation of learning culture has reshaped how students' access, process, and engage with knowledge and information. As a result, the use of multimedia tools, educational applications, and online platforms has become an integral part of contemporary educational practice.

Digital transformation in education improves learning quality by promoting interactive and personalized approaches that improve engagement and accessibility. It also expands the reach and affordability of online education. Tools such as microlearning, videos, interactive content, assessments, and AI-based strategies further strengthen student participation (Mhlanga, 2024).

### **Sustainable Development Goals 4 (SDG 4)**

SDG 4, adopted by the United Nations in 2015, aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. This objective places a strong emphasis on providing chances for high-quality education, giving people the skills, knowledge, and literacy they need to prosper in a world that is rapidly changing (Malik et al., 2025).

The transformation of students' learning culture from conventional methods to the use of digital technology is closely related to the achievement of SDG 4 (quality education) because SDG 4 not only emphasizes expanding access to education, but also improving the quality of the learning process, the relevance of competencies, and the effectiveness of learning experiences in higher education. Research conducted by Singh & Martolia (2024) shows that the application of digital technology in higher

education increases engagement, motivation, and access to broader learning resources, thus supporting the achievement of quality and inclusive education as targeted by the SDGs.

### **Factors Influencing the Transformation of Learning Culture**

The determination of the research variables was based on several previous studies, namely those by Bora Ly et al. (2024), Trioctavia et al. (2025), Zang & Shen (2024), Sulaiman (2023), and Jahaa & Ate (2024). Furthermore, the researchers identified several variables that have the potential to act as internal factors influencing the transformation of learning culture, particularly among students, including:

#### **Digital Literacy**

According to Paul Gilster (as cited in Pangrazio et al., 2020) digital literacy refers to the ability to understand and effectively use information presented in various formats and from diverse sources, particularly through computers and the internet. Paul Gilster divides digital literacy into four fundamental skills: knowledge assembly, content appraisal, hypertextual navigation, and internet searching.

#### **Self-Efficacy**

According to Albert Bandura (1977), self-efficacy is the conviction that one can control circumstances, carry out actions, and achieve positive outcomes to achieve specific goals. Bandura stated that there are three main dimensions of self-efficacy in learning, namely (1) magnitude, referring to the level of difficulty that an individual is considered capable of handling when carrying out a task, (2) generality, stating the extent to which an individual's abilities can be applied in overcoming various problems in all situations and conditions, and (3) strength, including the individual's belief in their own abilities.

#### **Self-Regulated Learning**

According to Zimmerman & Schunk (1989), self-regulated learning is an individual's ability to self-regulate during the learning process, where the individual actively monitors and regulates their own learning process. Therefore, this can be interpreted as independence, where a person can control themselves to achieve desired learning goals. Zimmerman & Schunk (1989) proposed three elements in self-regulated learning: metacognitive, motivational, and behaviorally active participants. Furthermore, research by Sa'idah & Habibi (2025) identified five indicators of self-regulated learning adapted from Zimmerman's theory: (1) Learning Planning, (2) Learning Motivation, (3) Learning Behavior, (4) Metacognition, and (5) Self-Evaluation.

#### **Perceived Ease of Use**

One theory that outlines a technology acceptance approach is the Technology Acceptance Model (TAM), which aims to explain the essential elements of user actions in accepting technology. This model emphasizes the attitudinal factor of each behavior with two variables, one of which is perceived ease of use (Davis et al., 1989). According to Davis et al. (1989), perceived ease of use is the degree to which a user can use an information system or technology easily without requiring much effort. Davis (1989) identified several dimensions of perceived ease of use: easy to use, clear and understandable, easy to learn, controllable, flexible, and easy to become skillful.

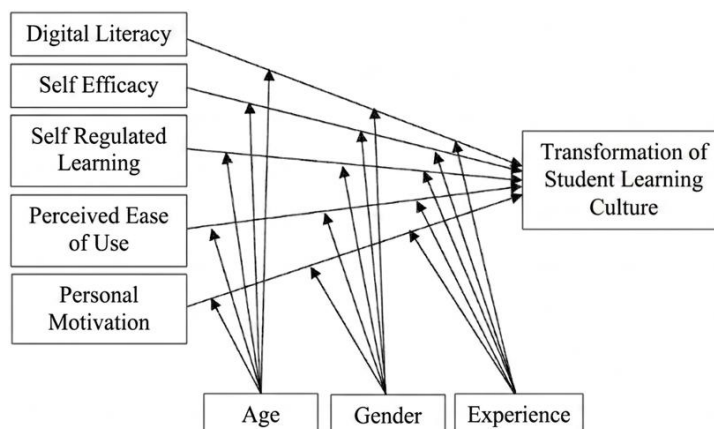
#### **Personal Motivation**

Self-Determination Theory (SDT), developed by Deci and Ryan in 1985, is used to better understand the influence of motivation on technology acceptance. This theory was selected to describe how students' adoption and use of technology are influenced by both intrinsic and extrinsic motivations (Bora Ly et al., 2024). Based on Self-Determination Theory (SDT), there are three basic aspects of psychological needs that form the basis for the emergence of personal motivation: autonomy, competence, and relatedness. As in research conducted by Bora Ly et al. (2024) and Chiu et al. (2024) who adopted Self-Determination Theory (SDT) to explain personal motivation variables, so that personal motivation can be measured using these 3 indicators.



## METHOD

This study used a quantitative approach with multivariate analysis to examine the variables influencing the transformation of students' learning culture. The setting of the study was in the Undergraduate Office Administration Education Study Program, Faculty of Economics and Business, Universitas Negeri Surabaya. The study proceeded through several stages: instrument development, sampling, data collection, and data analysis using Principal Component Analysis (PCA). This research uses a dependent (bound) variable, which is influenced by five independent (free) variables, namely: digital literacy, self-efficacy, self-regulated learning, perceived ease of use, and personal motivation.



**Figure 1. STRUCTURAL MODEL RESEARCH**

Source: Processed Data (2025)

In addition, control variables such as age, gender, and experience are also included in the framework because they are considered to have an influence on the independent variables. However, the control variables in this study are not analyzed directly in the main statistical model of the research. These variables are only used as demographic information to see whether the level of digital literacy, self-efficacy, self-regulated learning, perceived ease of use, and personal motivation are influenced by age, gender, or experience, so they are only used generally and are not discussed specifically.

The population was all active students from the 2022, 2023, and 2024 cohorts, totaling 829 students. These students had experienced a transition from conventional learning to digital methods, both synchronous (e.g., Zoom, Google Meet) and asynchronous (e.g., LMS, Google Classroom, instructional videos). In the sampling process, this study used probability sampling techniques with a proportional stratified random sampling approach, and a total of 270 respondents were obtained. According to Sugiyono (2014), probability sampling is a sampling technique that provides an equal chance for each element or member of the population to be selected as a sample member. Meanwhile, proportional stratified random sampling, according to Machali (2021), is a sampling technique used when the population has members or elements that are not homogeneous and are proportionally stratified.

Data were collected through observation, interviews, literature review, and a structured questionnaire. The questionnaire consisted of items derived from indicators related to learning culture and the use of digital learning technologies. Responses were measured using a five-point Likert scale ranging from (1) Strongly Disagree to (5) Strongly Agree. The questionnaire was distributed both online and directly via Google Forms. The researcher used the Principal Component Analysis (PCA) method with the help of IBM SPSS Statistics 24 software to manage and analyze data. The researcher used the PCA method with the help of IBM SPSS Statistics 24 software to manage and analyze data. In addition, the researcher also used the SEM-PLS method with the help of the SMART-PLS 4 application to examine the outer loading on the statement items of each variable.

## RESULTS AND DISCUSSIONS

### Data Analysis

The demographic information of the study participants is described in the data analysis. The list of respondents selected by the researchers was approximately 270. The respondents were selected based on all active students from the classes of 2022, 2023, and 2024, as shown in Table 1.

**Table 1.**  
**CHARACTERISTICS OF RESPONDENTS**

| Characteristics                     | Respondent   | Total      | %           |
|-------------------------------------|--------------|------------|-------------|
| Gender                              | Male         | 31         | 14%         |
|                                     | Female       | 239        | 86%         |
|                                     | <b>Total</b> | <b>270</b> | <b>100%</b> |
| Age                                 | 17-20 Years  | 154        | 57,03%      |
|                                     | 21-23 Years  | 115        | 42,59%      |
|                                     | >23 Years    | 1          | 0,37%       |
|                                     | <b>Total</b> | <b>270</b> | <b>100%</b> |
| Frequency of Digital Technology Use | Never        | 0          | 0%          |
|                                     | Rarely       | 0          | 0%          |
|                                     | Sometimes    | 17         | 6,30%       |
|                                     | Often        | 149        | 55,18%      |
|                                     | Very Often   | 104        | 38,51%      |
|                                     | <b>Total</b> | <b>270</b> | <b>100%</b> |

Source: Processed Data (2025)

### Factor Analysis

Hardisman (2021) highlight that factor analysis is an analysis applied to assess the feasibility of a research variable consisting of several measurement characteristics. Factor analysis, to put it simply, is an analysis that groups a large number of variables or objects into certain variables. The factor analysis technique employed in this investigation was Principal Component Analysis (PCA), which statistically describes the variance-covariance structure with a linear combination of measured variables. Before conducting PCA, the data were tested for normality. As the sample size exceeded 50, the Kolmogorov–Smirnov test was applied, yielding the following results:

**Table 2.**  
**NORMALITY TEST RESULTS**

| One-Sample Kolmogorov-Smirnov Test |           |                         |
|------------------------------------|-----------|-------------------------|
|                                    |           | Unstandardized Residual |
| N                                  |           | 270                     |
| Normal Parameters <sup>a,b</sup>   | Mean      | .0000000                |
|                                    | Std.      | 3.44088555              |
|                                    | Deviation |                         |
| Most Extreme Differences           | Absolute  | .051                    |
|                                    | Positive  | .034                    |
|                                    | Negative  | -.051                   |
| Test Statistic                     |           | .051                    |
| Asymp. Sig. (2-tailed)             |           | .088 <sup>c</sup>       |

Source: Processed Data (2025)

Table 2 shows that the data have a significance value greater than 0.05 (Sig. = 0.088), indicating that the data are normally distributed and suitable for further analysis.

**Table 3.**  
**KMO AND BARTLETT'S TEST**

| Test                          | Sig. Value |
|-------------------------------|------------|
| Kaiser-Meyer-Olkin Measure    | 0.858      |
| Bartlett's Test of Sphericity | 0.000      |

Source: Processed Data (2025)

Table 3 shows that Bartlett's Test of Sphericity has a Chi-Square value of 780.116 (df = 10) with a significance level of 0.000 ( $< 0.05$ ), indicating that the correlation matrix is not an identity matrix and is therefore suitable for factor analysis. Furthermore, the Kaiser-Meyer-Olkin (KMO) value obtained is more than 0.5, namely 0.858, so the factor analysis is worthy of continuing to the next process.

**Table 4.**  
**VARIABLE FEASIBILITY TEST**

| Variabels               | Anti Image Correlation $>0.50$ |
|-------------------------|--------------------------------|
| Digital Literacy        | 0.835                          |
| Self-Efficacy           | 0.888                          |
| Self-Regulated Learning | 0.861                          |
| Perceived Ease of Use   | 0.845                          |
| Personal Motivation     | 0.861                          |

Source: Processed Data (2025)

Table 4 shows that five variables were examined, and each one had an Anti Image Correlation value higher than 0.5, allowing the data analysis process to proceed to the following phase.

**Table 5.**  
**COMMUNALITIES TEST**

| Research Variables      | Initial | Extraction |
|-------------------------|---------|------------|
| Digital Literacy        | 1.000   | .675       |
| Self-Efficacy           | 1.000   | .711       |
| Self-Regulated Learning | 1.000   | .768       |
| Perceived Ease of Use   | 1.000   | .746       |
| Personal Motivation     | 1.000   | .636       |

Source: Processed Data (2025)

Table 5 shows that all research variables have a value  $>0.5$ , which means that all the variables above have a reasonable correlation with the factors that have been formed.

**Table 6.**  
**TOTAL VARIANCE EXPLAINED**

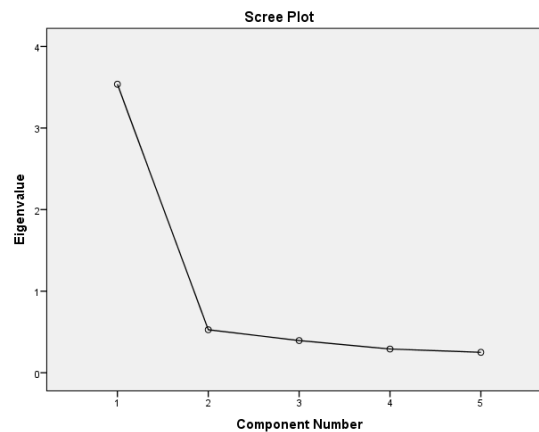
| Component | Total Variance Explained |               |              | Extraction Sums of Squared Loadings |               |              |
|-----------|--------------------------|---------------|--------------|-------------------------------------|---------------|--------------|
|           | Initial Eigenvalues      |               |              |                                     |               |              |
|           | Total                    | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % |
| 1         | 3.537                    | 70.747        | 70.747       | 3.537                               | 70.747        | 70.747       |
| 2         | .527                     | 10.540        | 81.287       |                                     |               |              |
| 3         | .395                     | 7.894         | 89.181       |                                     |               |              |
| 4         | .290                     | 5.805         | 94.986       |                                     |               |              |
| 5         | .251                     | 5.014         | 100.000      |                                     |               |              |

Source: Processed Data (2025)

Table 6 shows that there is one possible cause of the five variables analyzed. To determine the presence of a factor, the absolute eigenvalue score is  $>1$ . The eigenvalue of component 1 is 3.537 or  $>1$ , making it factor 1 and explaining 70.747% of the variation. The extraction sum of squared loadings score



indicates that the total value of one factor is sufficient to explain 70.747% of the variation. The total values of components 2, 3, 4, and 5 are not accumulated because their eigenvalue scores are  $<1$ , meaning they do not constitute a factor.



**Figure 2. SCREE PLOT**  
 Source: Processed Data (2025)

Figure 1 shows that it is evident from the vertical line (eigenvalue) and horizontal line (factor number) that component 1 is at a point  $>1$  and components 2, 3, 4, and 5 are at points  $<1$ . Based on the previous explanation, this indicates that there is 1 factor that is most suitable to be combined with the 5 variables.

**Table 7.**  
**COMPONENT MATRIX**

| Research Variables      | Component |
|-------------------------|-----------|
|                         | 1         |
| Digital Literacy        | .822      |
| Self-Efficacy           | .843      |
| Self-Regulated Learning | .877      |
| Perceived Ease of Use   | .864      |
| Personal Motivation     | .798      |

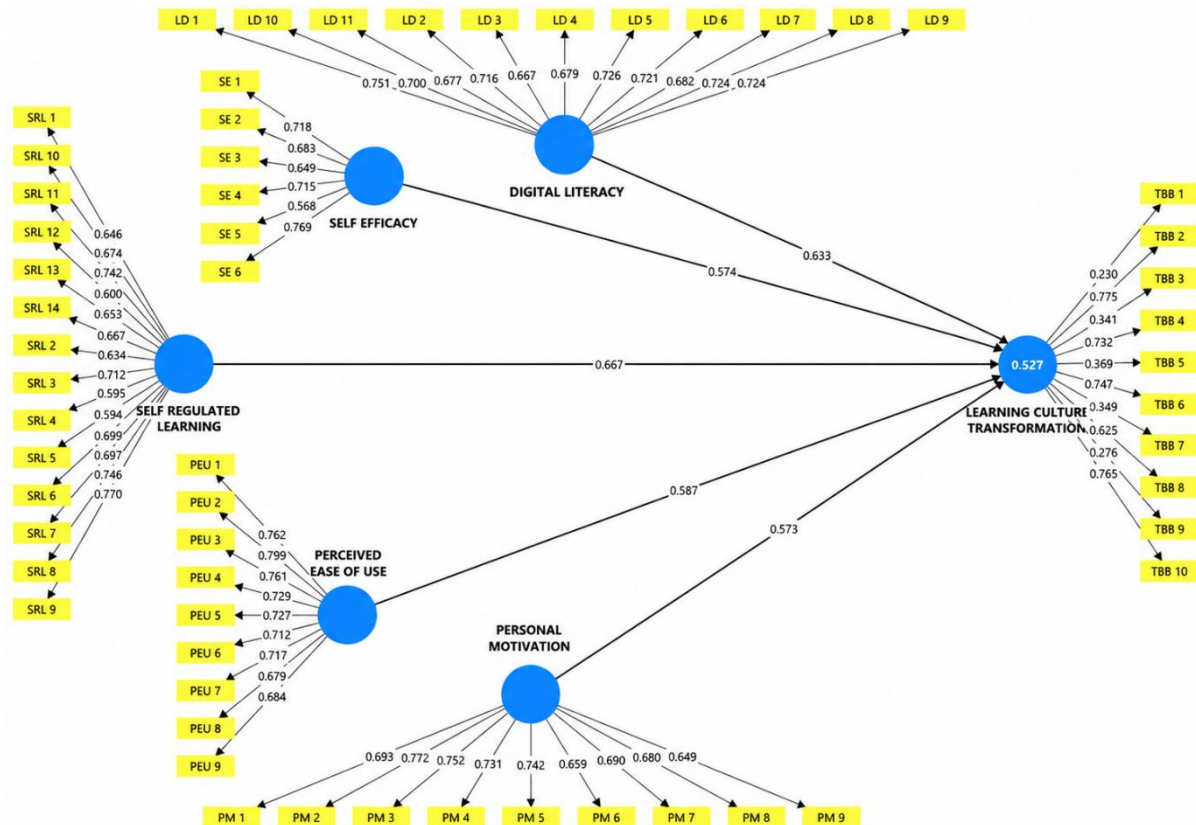
Source: Processed Data (2025)

Table 7 shows that the values in the table represent factor loadings, reflecting the correlation between one variable and factor 1. The variables have a fairly strong association, according to the results of digital literacy, self-efficacy, self-regulated learning, perceived ease of use, and personal motivation with component 1, with a value above 0.5.

According to statistical standards, the extraction of a single factor can be considered accurate if the number of variables extracted is below 30. In this study, there were five variables, thus meeting this standard. Therefore, the five variables above with one factor are considered appropriate, indicating that the variables of digital literacy, self-efficacy, self-regulated learning, perceived ease of use, and personal motivation are interrelated.

Based on the extraction results, the factor was labeled “Student Learning Capability Factor.” This name reflects the underlying internal capacities of students, encompassing digital literacy, self-efficacy, self-regulated learning, perceived ease of use, and personal motivation, which collectively influence the transformation of learning culture.

## Outer Loading Measurement Using SEM-PLS Method



**Figure 3. OUTER LOADING MEASUREMENT RESULTS USING THE SEM-PLS (STRUCTURAL EQUATION MODEL) METHOD**

Source: Processed Data (2025)

### Digital Literacy

Figure 2 shows that most items in the digital literacy variable have outer loading values approaching or above 0.70, such as LD 1, LD 2, LD 5, LD 6, LD 8, LD 9, and LD 10, thus categorizing them as strong in representing the construct of digital literacy. However, several items, such as LD 3 (0.667), LD 4 (0.679), LD 7 (0.682), and LD 11 (0.677), are relatively weak. This weakness is likely due to the varying levels of analytical and evaluative abilities of respondents, particularly in the aspects of hypertext navigation, content evaluation, and knowledge assembly, which require higher-order thinking skills. Every student's level of digital literacy varies, even though they are accustomed to using digital technology.

The strongest digital literacy indicators are internet searching and knowledge assembly, indicating that students are generally proficient in locating and organizing academic information online. Content evaluation is moderately strong but not yet optimal, while hypertext navigation is the weakest indicator, suggesting uneven ability in connecting and understanding relationships among digital information sources.

### Self-Efficacy

The outer loading results for the self-efficacy variable show that items SE 1, SE 4, and SE 6 have outer loadings of  $\geq 0.70$  and are categorized as strong. Conversely, SE 2 (0.638), SE 3 (0.649), and SE 5 (0.568) are considered weak. This weakness indicates that students' confidence in their ability to work independently without the help of others, as well as their confidence in handling cross-disciplinary assignments, has not yet developed evenly. This indicates that although students are quite confident, they still need external support in using digital learning technologies.

For the self-efficacy variable, the strongest indicators are the strength and level/magnitude dimensions, indicating relatively good student confidence in completing tasks using digital technology. Conversely, the weakest indicator is the generalization dimension, indicating that students' confidence in applying their digital skills across different fields and situations is still limited.

### **Self-Regulated Learning**

The self-regulated learning variable has a wide variation in outer loading values. Several items, such as SRL 3, SRL 8, SRL 9, and SRL 11, are classified as strong, while items SRL 1, SRL 2, SRL 4, SRL 5, SRL 6, SRL 7, SRL 10, SRL 12, SRL 13, and SRL 14 are classified as weak, with values below 0.70. The weaknesses of the SRL indicators are primarily due to the low consistency of self-regulation behaviors, such as independent learning planning, learning motivation, regular evaluation, and controlling learning focus.

Self-regulated learning activities require high discipline, which in practice has not yet fully become part of the student learning culture, despite the support of digital technology. The metacognition indicator in the self-regulated learning variable shows the highest score, followed by learning behavior and learning planning, while the learning motivation and self-evaluation indicators are classified as weak. The strong metacognition indicator indicates that students are relatively capable of planning, monitoring, and evaluating the learning process when using digital technology. However, the weak indicators of learning motivation and self-evaluation indicate that the internal drive to learn consistently and the habit of reflecting and improving learning have not been optimally formed.

### **Perceived Ease of Use**

The perceived ease of use variable showed relatively strong results, with the majority of items having outer loadings  $>0.70$ , such as PEU 1, PEU 2, PEU 3, PEU 4, PEU 5, PEU 6, and PEU 7. Items PEU 8 (0.679) and PEU 9 (0.684) were categorized as weak. This is likely due to differences in experience and level of digital technology mastery among respondents, particularly in the aspects of technology controllability and advanced skill development (ease of becoming skillful), which were not always perceived equally by all students.

The strongest indicators of perceived ease of use are easy to learn and easy to use, indicating that students generally find digital learning technology accessible and manageable. The indicators clear and understandable and flexible are also relatively strong. In contrast, easy to become skillful and controllable are the weakest indicators, suggesting that not all students feel fully capable of mastering or effectively controlling the technology to suit their learning needs.

### **Personal Motivation**

Some items in the personal motivation variable showed strong outer loadings, such as PM 2, PM 3, PM 4, and PM 5. Meanwhile, items PM 1 (0.693), PM 6 (0.659), PM 7 (0.690), PM 8 (0.680), and PM 9 (0.649) were classified as weak. These items' weaknesses primarily relate to the autonomy and relatedness indicators, which are subjective and contextual. Not all students consistently experience freedom, social connectedness, or warm relationships when using digital technology in learning.

Autonomy and competence emerge as the strongest indicators of personal motivation, indicating that students feel encouraged and empowered to develop their abilities in digital technology-based learning. In contrast, relatedness is the weakest indicator, suggesting that digital learning has not fully fostered social connectedness or emotional support, leading motivation to remain more individual and situational.

## DICUSSIONS

### **Self-Regulated Learning as a Dominant Factor in the Transformation of Student Learning Culture**

Based on the results of the factor analysis, Self-Regulated Learning emerged as the most dominant factor in shaping the "Student Learning Capability Factor," which influences the transformation of the learning culture of PAP UNESA students, with a component matrix value of 0.877. The SRL component matrix value is higher than the digital literacy factors of self-efficacy, perceived ease of use, and personal motivation. When measuring outer loading using the SEM-PLS method, the correlation value of SRL was also higher than the other factors, at 0.667. Therefore, SRL has the highest correlation with the transformation of learning culture compared to digital literacy, self-efficacy, perceived ease of use, and personal motivation.

The results show that the transformation of learning culture in higher education is largely determined by students' ability to manage their learning process independently. Students who can plan, monitor, and evaluate their learning activities tend to be more adaptive to changes in the learning system and environment. These findings are backed by studies conducted by Kharis et al. (2024) demonstrated how well digital technology facilitates self-regulated learning, allowing students to actively interact with their course materials while attending lectures. Quality education is measured not only by access and learning facilities, but also by pupils' capacity to develop into self-sufficient learners who can sustainably oversee their educational journey.

### **Digital Literacy Factors in Supporting the Transformation of Student Learning Culture**

Considering the findings of this study's factor analysis, digital literacy is one of five variables that make up the "Student Learning Capability Factor," influencing the transformation of learning culture among PAP UNESA students, with a component matrix value of 0.822. When measuring outer loading using the SEM-PLS method, the correlation value of the digital literacy factor with the transformation of learning culture was 0.633, indicating a strong and substantial positive relationship.

These findings support a study by Trioctavia et al. (2025) which claims that the quick advancement of digital technology has replaced traditional print sources with a variety of more easily accessible digital references. Platforms such as Google Scholar, ResearchGate, and other open-access repositories have provided students with faster and broader access to academic materials. The research by Trioctavia et al. (2025) also shows that digital literacy is closely correlated with student academic productivity, where students with good digital literacy are able to search and select, and they make better and more efficient use of knowledge, which speeds up their learning process.

### **Self-Efficacy Factors in Supporting the Transformation of Student Learning Culture**

Based on the results of the factor analysis in this study, self-efficacy is one of five variables that make up the "Student Learning Capability Factor," influencing the transformation of learning culture among PAP UNESA students, with a component matrix value of 0.843. When measuring outer loading using the SEM-PLS method, the correlation value of the self-efficacy factor with the transformation of learning culture was 0.574, indicating a strong and substantial positive relationship.

In the context of the transformation of student learning culture, Students' confidence in their capacity to successfully traverse the university learning process is impacted by their level of self-efficacy. According to research findings, students who have high levels of self-efficacy are more likely to feel comfortable overcoming academic obstacles and adjusting to shifting learning styles, such as the demands of independent study, the use of digital platforms, and completing assignments that emphasize mastery of digital competencies.

These results align with research by Jahaa & Ate (2024), which states that self-efficacy has a significant influence on individual readiness to utilize technology as a learning tool. The results of the study also confirmed that students with strong self-confidence more easily adopt learning technology, do not give

up easily when facing technical obstacles, and are able to optimize technology to support academic achievement.

### **Perceived Ease of Use Factor in Supporting Student Learning Culture Transformation**

Based on the results of the factor analysis in this study, perceived ease of use is one of five variables that make up the "Student Learning Capability Factor," influencing the transformation of learning culture among PAP UNESA students, with a component matrix value of 0.864. When measuring outer loading using the SEM-PLS method, the correlation value between perceived ease of use and learning culture transformation was 0.587, indicating a strong and substantial positive relationship.

Perceived ease of use encourages students to be more open to changes in learning methods, from conventional patterns to more independent, flexible, and technology-based learning. In this study, perceived ease of use contributes to demonstrating that the easier a learning system is to understand and use, the greater the opportunity for students to internalize a new, adaptive, and self-development-oriented learning culture.

This finding aligns with research by Bora Ly et al. (2024), which confirmed that perceived ease of use significantly influences the students' use and utilization of digital learning platforms. The research showed that ease of navigation, clarity of features, and minimal technical barriers encouraged students to actively utilize learning technology. This also changed students' attitudes and learning habits, making them more independent, exploratory, and oriented toward utilizing digital learning resources.

### **Personal Motivation Factors in Supporting the Transformation of Student Learning Culture**

Based on the results of the factor analysis in this study, personal motivation is one of five variables that make up the "Student Learning Capability Factor," influencing the transformation of learning culture among PAP UNESA students, with a component matrix value of 0.798. When measuring the outer loading using the SEM-PLS method, the correlation value of the personal motivation factor with the transformation of learning culture was 0.573, indicating a strong and substantial positive relationship.

Personal motivation is an internal factor that also plays a vital part in supporting the transformation of student learning culture, as it is directly related to students' intrinsic and extrinsic motivation in managing and developing their learning process. The findings of this study are consistent with those of Bora Ly et al. (2024), who verified that student adoption and use of digital learning are significantly influenced by personal motivation. This study highlighted the potential effectiveness of personal motivation elements such as relatedness, competence, and autonomy. For instance, learning platforms that allow for customisation and customization encourage independence, while chat rooms and forums allow for peer engagement and can improve relatedness.

This research contributes to demonstrating that self-regulated learning is the most dominant factor influencing the transformation of the learning culture of students in the Office Administration Education Study Program at Surabaya State University, in line with modern learning theory that positions students as independent, active, and reflective learners. This finding also strengthens the link between the transformation of learning culture and the achievement of SDG 4, especially in raising the standard of education and promoting lifelong learning. For students, this research contributes to developing self-regulated learning skills, building social relationships through collaboration, and optimally utilizing digital facilities such as the Learning Management System (LMS) and online learning resources. For lecturers, the findings of this study form the foundation for designing innovative and interactive learning strategies such as Pjbl, collaborative discussions, and the use of digital platforms. Meanwhile, for study programs and institutions, this research emphasizes the importance of providing and optimizing digital technology infrastructure to support flexible and sustainable learning.



## CONCLUSION

The findings lead to two main conclusions. First, the Principal Component Analysis (PCA) revealed a single underlying factor influencing the transformation of learning culture among students of the Office Administration Education Study Program (PAP) at Universitas Negeri Surabaya. This factor, termed the Student Learning Capability Factor, consisted of five interrelated variables: digital literacy, self-efficacy, self-regulated learning, perceived ease of use, and personal motivation. Second, among these variables, self-regulated learning is the most dominant factor, as indicated by its highest factor loading. This result highlights the central role of students' ability to independently plan, manage, and evaluate their learning in driving the transformation of learning culture. Therefore, strengthening students' self-regulated learning skills should become a strategic priority in supporting sustainable digital-based learning practices in higher education.

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