

The Correlation between Serendipitous Learning, Teacher Resilience and Reflective Pedagogy

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Abstract

This paper examines how university teachers view serendipitous learning, teacher resilience, and reflective pedagogy. Objectives of the studies were: to measure the extent of serendipitous learning, teacher resilience, and reflective pedagogy, and to explore the inter-relationship between serendipitous learning, teacher resilience, and reflective pedagogy in teachers at the university level. A structured questionnaire was used to collect quantitative data from faculty members of the International Islamic University, Islamabad (IIUI). The population was the teachers who were teaching MS and PhD scholars at the MS and PhD levels in the Fall 2024 semester; 50% teachers were selected from both faculties (Education faculty & Social Sciences) using a proportionate stratified sampling technique. Results were analyzed using Excel and Power BI. The findings revealed the extent and significant correlations among teacher resilience, reflective pedagogy, and serendipitous learning in the field. The results indicate that teacher resilience and reflective practices increase the likelihood of serendipitous learning, which in turn effectively enhances the teaching process. The paper highlights the role of these factors in creating dynamic and adaptive teaching conditions at the university level. Universities should foster spontaneous learning by promoting reflective pedagogy and resilience-building programs for their faculty members.

Keywords: *Serendipitous learning, teachers' resilience, reflective pedagogy, university teachers*

Introduction

Academic instruction at the university level is a complex task that requires flexibility, sustainability, and the ability to capitalize on unexpected learning opportunities. The issue in the scholarly literature regarding the functions that serendipity, resilience, and reflective pedagogy play has helped to derive that the following dimensions are significant in shaping the classroom and the higher education field as a whole. Serendipity, or the combination of unexpected discoveries and learning outcomes, has been proven to be a much more enriching instructional process compared to didactic procedures (Ryder & Nutefall, 2016). Similarly, teachers must rely on resilience, which allows them to cope with turbulence, accept the role of institutional change, and remain active in a challenging academic environment (Cole et al., 2022).

The perspective of reflective pedagogy is to encourage teachers within a particular field to reflect on their pedagogical practices, with the aim of ensuring improved performance and increased student involvement. These three constructs, which have a dynamic relationship, are serendipitous learning, resilience, and reflective pedagogy. An instance of serendipity, for example, may be capitalized upon through reflective activities; the experience is then integrated into an instructional practice. When teachers learn to be resilient, they are better equipped to identify and utilize opportunities that are often overlooked and therefore incorporate acts of reflection into their instructional repertoire. A feedback loop is created in effect where one component supports other components. When combined with the potential of these constructs, the overall effect is the ability of higher education to transform, resulting in increased engagement, reflective thinking, and a goal of continuous learning among students (Bhuttah et al., 2024).

In today's education, problem arises from the need to capture and get the most out of unplanned spontaneous emergent learning opportunities. The issue lies in teachers' tendency to overlook emergent and unexpected learning opportunities due to traditional teaching methods, hindering students' creativity, curiosity, open-mindedness and holistic development. There is a need to explore the relationship of serendipitous

learning, the resilience of teachers, reflective teaching methods. While various aspects of these elements have been individually studied in the literature, comprehensive research is needed to delve into their interconnected dynamics. This gap limits students' ability to fully engage and benefit from serendipitous learning, teacher resilience, and reflective pedagogy in instruction, potentially hindering their holistic development and creativity. Bridging this gap is vital to enhance practices that cater to the challenges and opportunities faced by teachers in higher education.

Research Objective

- To measure the extent of serendipitous learning, teacher resilience and reflective pedagogy in teachers at university level.
- To explore the inter-relationship between serendipitous learning, teacher resilience and reflective pedagogy in teachers at university level.

Research Question

- What is the extent of serendipitous learning, teacher resilience, and reflective pedagogy as perceived by university teachers?

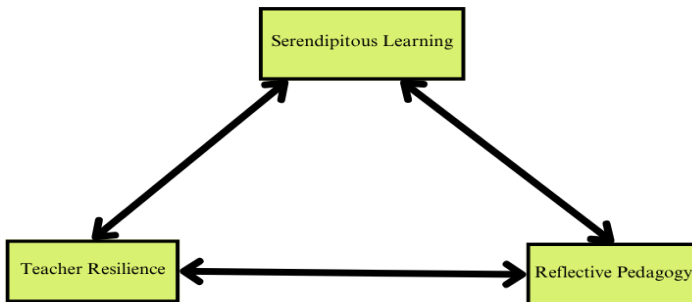
Research Hypothesis

- H_{01} Is there a significant relationship among serendipitous learning, teacher resilience, and reflective pedagogy in university teachers?

Conceptual Framework

Figure 1

Relationship between Serendipitous Learning, Teachers' Resilience and Reflective Pedagogy



Note: Conceptual Framework

Literature Review

Serendipity in education represents the occurrence of emergent spontaneous yet beneficial learning experiences, which can significantly enhance the educational journey (Van Rensburg, 2024). Serendipity, often regarded as a "happy accident," is not solely based on chance; it requires individuals to prepare their minds to recognize and capitalize on opportunities as they arise (Race & Makri, 2016). Cultivating an environment of communication and trust is essential for educators to leverage serendipitous moments, as it promotes the open exchange of ideas and perspectives (Van Rensburg, 2024). Environmental and personal factors influence the experience of serendipity, encompassing the production, distribution, and consumption of information (Revglio, 2019). Some suggest serendipity can be stimulated, or that certain people may "encounter" serendipitous information more than others (Foster & Ford, 2003).

Serendipity involves unplanned encounters with resources that are found to be interesting, highlighting the role of both environmental and personal factors in creating valuable learning opportunities (Björneborn, 2017). It involves recognizing an unexpected situation or result, connections via analogy or linkages, and the integration of multiple perspectives through group formation (Van Rensburg, 2024). By definition, serendipity is when people find something that they were not originally looking for but turns out to be useful or interesting (Et.al, 2021). Resilience, the capacity to recover quickly from difficulties, is a critical attribute for educators in the ever-evolving landscape of higher education (Riquelme et al., 2022). It is especially important considering that it is unrealistic to expect pupils to be resilient if their teachers do not demonstrate resilient qualities (Gu & Day, 2006). Resilience in teaching is viewed as a stress-managing aptitude (Ma, 2021). Educators face numerous challenges, including increasing student diversity, technological advancements, and evolving pedagogical approaches, making resilience essential for maintaining their effectiveness and well-being (Pozo-Rico et al., 2023).

The nature of resilience is determined by the interaction between the internal assets of the individual and the external environments in which the individual lives and grows (Gu & Day, 2006). Resilient individuals adapt to challenging conditions effectively, demonstrating a positive

response to adversity (Talaie et al., 2024). Teacher's resilience is defined as the ability to regain strengths or spirit under challenging circumstances. Resilience goes beyond mere survival; it involves thriving and growing in the face of adversity, enabling teachers to maintain their passion for teaching and create positive learning environments (Beltman et al., 2011). Reflective pedagogy represents a fundamental paradigm shift in the current higher education field, whereby it is paramount to move away from teacher-oriented education to a learner-oriented approach that supports the development of critical consciousness, increased self-awareness, and a commitment to lifelong learning.

Aware of an explicit sacrifice in the quality of content coverage, reflective teaching enables students to develop their more advanced thinking routines, a fundamental aspect of helping students understand how their learning patterns affect academic performance (Flores et al., 2010). The regimen provides the conceptual and practical space where educators can study their classroom practices, thereby refining their instructional methodology by observing the systematic consequences of what is being taught (Machost & Stains, 2023). Finally, the reflective cycle, which entails re-evaluation, reconsideration, relearning, and re-analysis, facilitated the ability of instructors to align their course strategies to the varied needs of their learners and, at the same time, induce more engagement and achievement in their students. Essentially, the process is a repetitive, evidence-based exploration of effectiveness: what works, what does not work, and how it can be improved, enhancing the learning outcomes of every learner (Nguyen, 2019).

Reflective teacher refers to the construct that stands fully at the forefront of current debates about reflective methodology, as pedagogy should also be questioned through a similarly reflective lens to what controls the learning process itself (Costa et al., 2021). When both teaching practice and the student process are characterized by reflection, then we see continuous enhancements of both the learner and the teacher. The reflective practice enables educators to be flexible in their pedagogical decisions in response to the changing needs of students, thereby developing inclusive classrooms that cater to high performers. In the university setting, reflection is strategically incorporated to allow learners room to challenge their understandings, prior preconceptions, and learning paths (Pang, 2020). Through the use of reflective methods, educators encourage learners

to reflect on their learning experiences in a critical manner, thereby boosting lifelong analytical skills in lifelong learning (Akhmetova & Khaliullina, 2023). As a result of such self-reflection, teachers contribute to increasing the knowledge of learners' personal beliefs and dispositions, which, in turn, leads to the emergence of new aspects of views and methods (Suryarini & Bahtiar, 2021).

Regular journaling as part of curricular design is one of the outstanding strategies to facilitate the incorporation of reflective practice into the instructional landscape. This allows students to record their thoughts, hypotheses, and questions regarding the course material, facilitating critical self-reflection and further engagement with the material. Peer review is another strategy that is as effective as it allows students not only to receive but also to provide their colleagues with constructive criticism about their performance, thereby fostering a truly collaborative learning environment. The technique of reflection might be further reinforced by making it an organized, elaborative, and engaging structured experience, such as case-study analysis, lesson-planning exercises, or microteaching simulations, all of which provide students with practical grounds to study and improve their teaching interventions. It is also crucial to foster a classroom atmosphere that supports transparent communication, respectful confrontation, and constructive criticism. This atmosphere of inclusivity and psychological safety is not only promoted by making the educational value of feedback central but also by drawing on students to address their viewpoints, which is an indication of acknowledgment and respect for their lived experiences (Machost & Stains, 2023).

In the academic literature on teacher development, it is already well-established that long-term professional growth cannot be achieved without conscious reflection (Juma, 2024). These scholars support the direct addition of reflection to both curriculum design and teaching practice. Although this commitment requires careful planning of activities and the systematic implementation of ideas, it also has the potential to transform pedagogy and enhance the learning outcomes of students. By developing reflective practices, teachers become more resilient and adaptive, which is crucial to their success as educators (Cole et al., 2022). In turn, by ensuring perseverance in questioning personal assumptions, instructors are described as more flexible in responding to classroom

dilemmas and in creating a favorable educational environment that supports academic performance and individual growth (Juma, 2024).

Regarding modern-day teaching, the ability to practice reflection produces teacher resilience and flexibility, i.e., two values that are critical to help manage various professional needs. Systematic practice of self-reflection enables educators to address challenges more effectively, as well as develop alternative viewpoints that can enhance the learning experience for both educators and students (Baluchzada, 2023).

When it comes to strategic teaching requires ongoing self-appraisal and a deliberate review of teaching practices (Juma, 2024). Through this critical reflection, teachers can identify areas for improvement and adjust their plans to be more responsive to learners' needs (Grech, 2020). Reflective thinking on experiences, feelings, thoughts, and actions also helps students enhance their learning and individual growth (Juma, 2024). Educators can also utilize feedback from students, coworkers, and mentors to measure the effectiveness of the methods they employ, thereby establishing a culture of teamwork and ongoing professional development.

The professional competencies of teachers can be reinforced through systematic reflection, and educators with relatively well-developed reflective skills have a greater likelihood of analyzing, controlling, and optimizing their classroom interventions (Smetanina et al., 2020). When adopted as a systematic habit, reflective inquiry fosters a growth mindset and a culture of continuous learning (J. Jarvinen et al., 1995). Self-reflection enables students to take ownership of the learning process and make decisions to change their approaches as needed, which fosters a growth mindset (Bhardwaj et al., 2025). The promotion of critical thinking among students is linked to improved grades and an ongoing interest in education for adult life (Barnett & O'Mahony, 2006; Forrest, 2008; Gudeta, 2022). The strength of associating the theoretical with the practical is further demonstrated in the formulation of the concept of reflective practice, which emphasizes that students must develop professional behavior from the outset of their studies (Mann et al., 2007).

Methodology

The research methodology utilized a quantitative research design, aiming to collect data from university teachers. A structured questionnaire

was administered to collect data regarding teaching practices for serendipitous learning, teacher resilience and reflective pedagogy at the university level. The population were the teachers who were teaching MS and PhD scholars at the MS and PhD levels in the Fall 2024 semester, 50% teachers were selected from both faculties (Education faculty & Social Sciences faculty) using a proportionate stratified sampling technique. Statistical analysis, descriptive statistics, was conducted to examine the relationships and trends within the collected data. A total of 18 teachers were selected for the sample, and 15 teachers responded to the survey. Data was analyzed using Excel and Power BI.

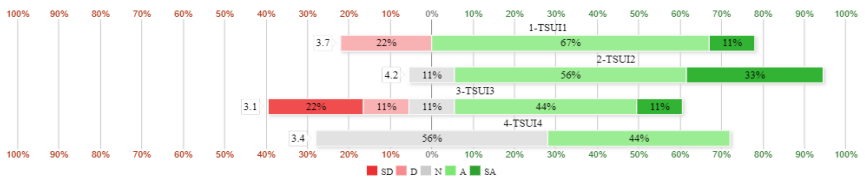
Results

Serendipitous Learning

Figure 2

Participant Response to Understanding and Integrating Serendipity in Teaching Practices

1-TSUI1, 2-TSUI2, 3-TSUI3 and 4-TSUI4



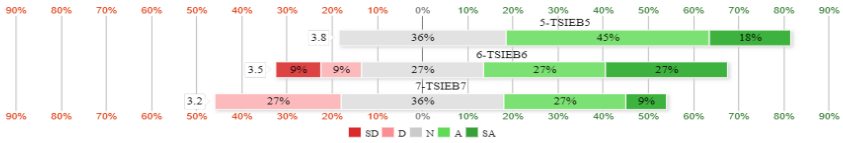
Note: SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree. Response percentages are based on a 5-point Likert scale. Mean scores are shown to the left of each bar.

The results indicate that 67% of respondents are familiar with the concept of serendipity in teaching (1-TSUI1), with a mean score of 3.1. Furthermore, 56% believe that serendipitous discoveries enhance the learning experience (3-TSUI3), with a mean score of 4.2. While 44% intentionally incorporate serendipitous discoveries into their teaching, 56% encounter such opportunities rarely (4-TSUI4), with a mean score of 3.7.

Figure 3

Participants Response to Impact of Serendipity Student Engagement and Barriers

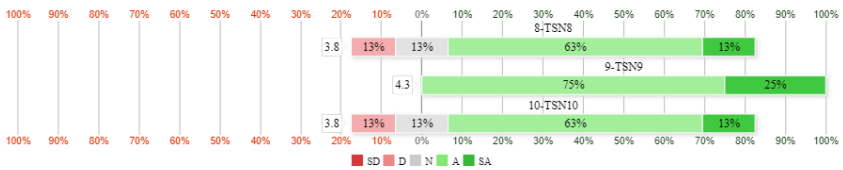
5-TSIEB5, 6-TSIEB6 and 7-TSIEB7



The mean scores are 3.5 (5-TSIEB5), 3.8 (6-TSIEB6), and 3.2 (7-TSIEB7). The data indicates that 45% of respondents believe that introducing serendipitous elements enhances student engagement, with 27% reporting positive results from unexpected learning experiences. However, 36% acknowledge that challenges affect the integration of serendipitous learning.

Figure 4
Participants Response to Training Needs for Serendipitous Pedagogy

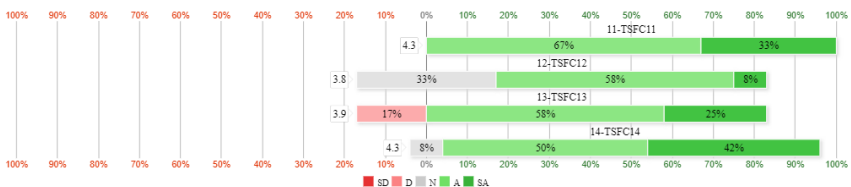
8-TSN8, 9-TSN9 and 10-TSN10



The mean scores are 3.8 (8-TSN8), 4.3 (9-TSN9), and 3.8 (10-TSN10). A majority (75%) feel that embracing serendipity fosters pedagogical innovation, with 63% aligning the concept with their teaching philosophy. However, 13% are interested in professional development related to serendipitous teaching, and 13% find frequent unforeseen opportunities to enhance learning.

Figure 5
Participants Response to Fostering Creativity Through Teacher Preparedness

11-TSFC11, 12-TSFC12, 13-TSFC13 and 14-TSFC14



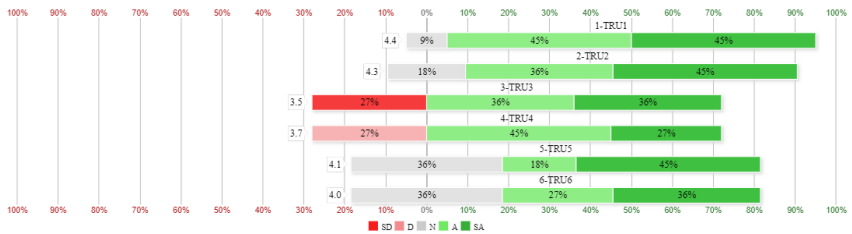
The mean scores are 4.3 (11-TSFC11), 3.8 (12-TSFC12), 3.9 (13-TSFC13), and 4.3 (14-TSFC14). The responses show that 67% are efficient in responding to unexpected discussions, with 58% encountering unforeseen opportunities to enhance learning. Additionally, 50% encourage students to explore unknown fields, contributing to fostering creativity through serendipitous learning.

Teacher Resilience

Figure 6

Participants Response to Resilience: Understanding, Reflection and Impact in Teaching

1-TRU1, 2-TRU2, 3-TRU3, 4-TRU4, 5-TRU5 and 6-TRU6

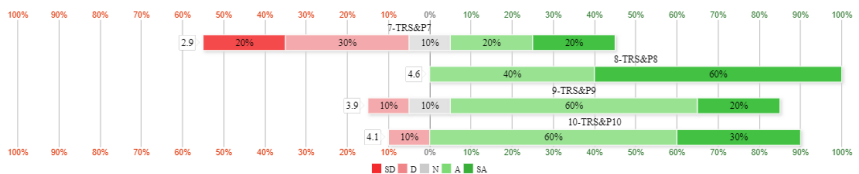


The responses to statements on resilience in teaching show a generally high level of understanding and importance, with mean scores ranging from 3.5 to 4.4. For statement 1-TRU1, 45% of respondents strongly agreed, and 45% agreed, indicating a consensus on the significance of resilience. However, for statements like 3-TRU3 and 4-TRU4, there was a broader distribution of responses, with about 27% strongly disagreeing or disagreeing, showing some variability in perceived resilience in facing challenges.

Figure 7

Participants Response to Support and Professional Development

7-TRS&P7, 8-TRS&P8, 9-TRS&P9 and 10-TRS&P10

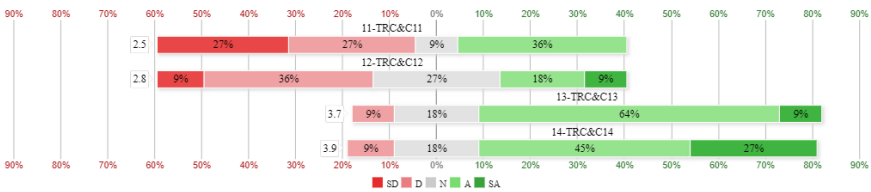


For the question on institutional support (8-TRS&P8), 80% of respondents agreed or strongly agreed, with a mean score of 4.6, indicating a positive

view of institutional backing. Statements 7-TRS&P7 and 9-TRS&P9 received lower scores, particularly with 30% of respondents strongly disagreeing with the support offered for teacher resilience development. Overall, teachers showed an interest in professional development opportunities; however, the use of mindfulness or peer support strategies was viewed as more mixed.

Figure 8
Participants Response to Challenges and Coping Mechanisms

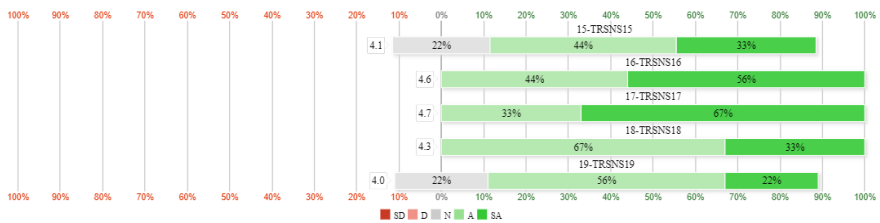
11-TRC&C11, 12-TRC&C12, 13-TRC&C13 and 14-TRC&C14



The responses on challenges and coping mechanisms varied, with statement 11-TRC&C11 scoring a mean of 2.5, where 27% strongly disagreed about having resources when overwhelmed. In contrast, statement 13-TRC&C13 scored higher, with 64% agreeing that they managed stress well. While the results reflect occasional feelings of hopelessness, the overall response indicates a good ability to balance the demands of teaching with stress management.

Figure 9
Participants Response to SNS-Enabled Resilience (Social Network Services): Boosting Self Efficacy and Job Satisfaction

15-TRSNS15, 16-TRSNS16, 17-TRSNS17, 18-TRSNS18 and 19-TRSNS19



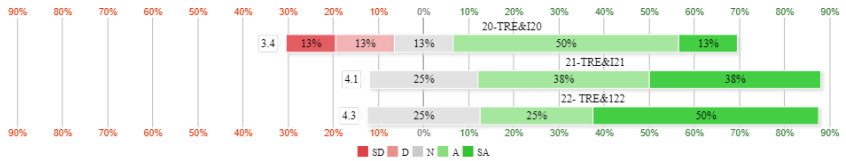
Teachers felt confident in their teaching abilities, with 56% strongly agreeing that the positive impact of SNS integration on job satisfaction (17-TRSNS17) was reflected in a mean score of 4.7. SNS’s role in engaging

students was also well-received, as indicated by the mean score of 4.6 for 16-TRSNS16. Responses indicate a strong belief that SNS use contributes positively to their professional engagement and overall resilience.

Figure 10

Participants Response to Environmental and Individual Factors

20-TRE&I20, 21-TRE&I21 and 22-TRE&I22



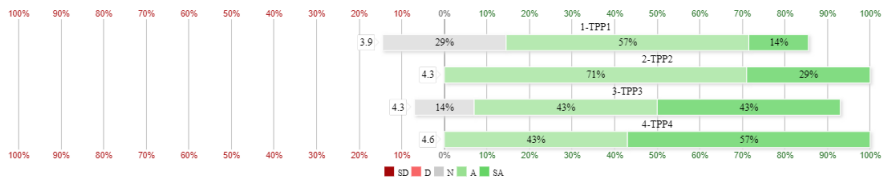
The analysis reveals that individual factors, such as self-confidence, emotional intelligence, and optimism, are deemed crucial in fostering resilience, with mean scores ranging from 4.0 to 4.3. In particular, statement 22-TRE&I22 received 50% agreement, emphasizing the importance of supportive environments for resilience. While the responses varied slightly for self-care strategies, teachers agreed on the significance of emotional and environmental support for maintaining resilience in the classroom.

Reflective Pedagogy

Figure 11

Participants Response to Reflective Practices

1-TPP1, 2-TPP2, 3-TPP3 and 4-TPP4

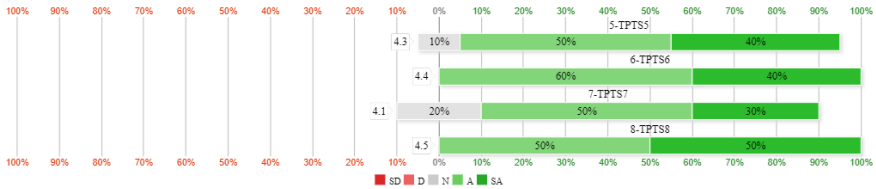


The results reveal that engagement in reflective practices is frequent, with mean scores ranging from 3.9 to 4.6. In particular, statement 1-TPP1 (mean 3.9) reflects a moderate level of engagement in reflective practice. In contrast, statement 4-TPP4 (mean 4.6) indicates a strong belief in the importance of reflective practice for enhancing student learning outcomes and professional development. Overall, the responses highlight the positive impact of reflective practices on both teaching and learning outcomes.

Figure 12

Participants Response to Teaching Strategies

5-TPTS5, 6-TPTS6, 7-TPTS7 and 8-TPTS8

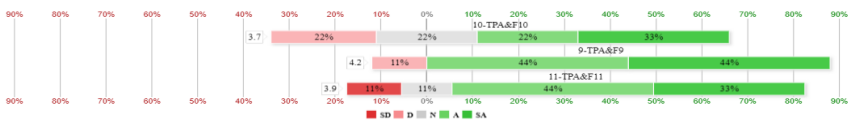


The results indicate a high level of integration of reflective practices in teaching, with mean scores ranging from 4.1 to 4.5. In particular, statement 8-TPTS8 (mean 4.5) indicates that respondents frequently incorporate reflective practices to adapt their teaching methods, while statement 5-TPTS5 (mean 4.3) highlights the integration of technology into their teaching. Reflective practices are considered essential for enhancing student engagement and learning outcomes, with 50% of respondents acknowledging their importance.

Figure 13

Participants Response to Assessment and Feedback

10-TPA&F10, 9-TPA&F9 and 11-TPA&F11

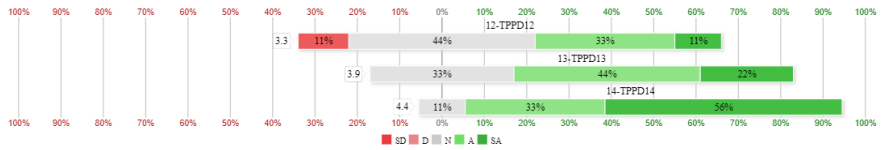


The responses to the survey questions average between 3.7 and 4.2, indicating a high level of conformity that such practices are essential. The lower mean scores in Statement 10-TPA&F10 (mean 3.7) indicate that the level of confidence regarding reflective practice in assessment is slightly lower; however, in Statement 9-TPA&F9 (mean 4.2), the confidence level regarding the efficacy of reflective practice is very high. Once placed in the context of the professional growth and evaluation of student learning, the evidence supports the conclusion that reflective practice is one of the foundations of efficient teaching in higher education.

Figure 14

Participants Response to Professional Development

12-TPPD12, 13-TPPD13 and 14-TPPD14

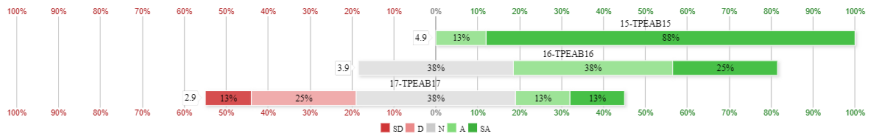


Reflective practices have a significant impact on teaching and learning outcomes, as indicated by the mean scores of 3.3 on statement 12-TPPD12 and 4.4 on statement 14-TPPD14, which were obtained through a systematic analysis of the data. Although Statement 12 lacks the strength of the majority of the findings, probably due to the scholarly debate about the exact use of reflections in student assessment, these initial findings nevertheless support a strong awareness of reflective practices as a fundamental need in professional development and methodological adaptation.

Figure 15

Participants Response to Equity, Access and Barriers

15-TPEAB15, 16-TPEAB16 and 17-TPEAB17

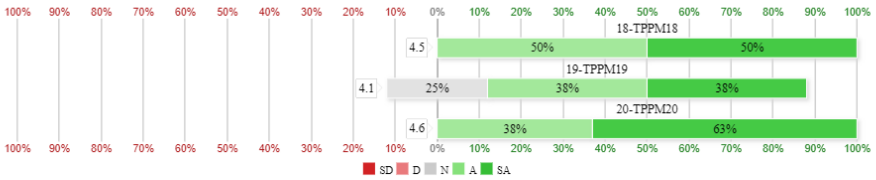


The results indicate that reflective practices are generally considered essential for promoting teaching and learning. The mean points on statements are between 2.9 (statement 15-TPEAB15) and 4.9 (statement 17-TPEAB17). Statement 17-TPEAB17, with a mean of 4.9, demonstrates a firm agreement regarding the significance of reflective practice, while statement 15-TPEAB15, with a mean of 2.9, indicates a more moderate opinion on student engagement. Combined with the high mean scores of most statements, it is apparent that respondents view reflective practices as necessary not only for enhancing teaching proficiency but also for promoting professional growth.

Figure 16

Participants Response to Pedagogical Methods

18-TPPM18, 19-TPPM19 and 20-TPPM20



The empirical results indicate the existence of a customary tendency to repeat reflective practices to improve pedagogical strategies, with average scores ranging from 4.1 to 4.6. Specifically, statement 20-TPPM20 (mean 4.6) indicates a firm entrenchment of reflective practices to promote student involvement. In comparison, TPPM18-statement 18(4.5 averages) testifies to the universal belief in the effectiveness of these methods in improving student performance. The overall evidence supports the notion that reflective practices are essential tools for methodological adjustment and maintaining student engagement.

Correlation between Serendipitous Learning, Teacher Resilience and Reflective Pedagogy

Table 1

Correlation b/w Serendipitous Learning, Teacher Resilience and Reflective Pedagogy

Variable	M	SD	1	2	3
Serendipitous Learning	3.8	0.44	—	—	—
Teacher Resilience	3.9	0.49	0.98**	—	—
Pedagogy	4.2	0.40	0.95**	0.97**	—

****Note:** M and SD are used to represent Mean and Standard Deviation respectively. Correlation is significant at 0.01 level (2-tailed). The table shows the mean (M) and standard deviation (SD) for three variables: Serendipitous Learning (M = 3.8, SD = 0.44), Teacher Resilience (M = 3.9, SD = 0.49), and Pedagogy (M = 4.2, SD = 0.40). The correlation between Serendipitous Learning and Teacher Resilience is highly significant, with a coefficient of 0.98 at the 0.01 level (2-tailed). Additionally, both Serendipitous Learning and Teacher Resilience are

strongly correlated with Pedagogy, with coefficients of 0.95 and 0.97, respectively, indicating significant relationships at the 0.01 level.

Above results have significant implications for how university teachers consider the functions of serendipitous learning, teacher resilience, and reflective pedagogy in their teaching practices. Data analysis suggests that the following dimensions received the highest appreciation: serendipitous learning, with an average score of 3.8; teacher resilience, with a score of 3.9; and reflective pedagogy, with a score of 4.2. These findings confirm that such constructs are regarded as significant tools to intensify teaching performances. It is worth mentioning that serendipitous learning demonstrates a close relationship with both teacher resilience and reflective pedagogy, meaning that resilient teachers can more easily follow the practices of reflection and benefit from unexpected learning mishaps. Such data, therefore, convincingly confirm hypothesis H_{01} , which postulates that these factors have a remarkable association.

Discussion

Current results reveal the validity of existing research on serendipitous learning, teacher resilience, and reflective pedagogy in higher education. Specifically, the fact that respondents attribute a mean rating of 3.8 to the concept of serendipitous learning reaffirms the conclusions made by Bjornborn (2017) and Reviglio (2019), as both authors ascertain the key role of environmental and individual factors in triggering unintended but pertinent instances of learning. Similarly, Van Rensburg (2024) has also argued that communication-based and trust-supported classroom environments provide the context for spontaneous learning experiences. This condition has been reiterated by other participants as a reason to feel connected, in this instance, when endorsing these experiences.

The current paper supports previous research on the concept of teacher resilience that is presented in Gu and Day (2006) and Pozo-Rico et al. (2023) by revealing that resilience is an important part of handling the ever-changing nature of the profession. The findings in particular show that resilient teachers exhibit not only a higher level of stress management ability but are also described by a higher level of openness to serendipitous learning and an increased tendency to apply reflective pedagogy. These findings support the results of Beltman et al. (2011) who considered

resilience as the factor that promotes professional development and perpetuates passions even in the cases of persistent challenges.

These results demonstrate a close relationship with earlier studies on reflective pedagogy, as the nominal mean score of 4.2 indicates a higher degree of agreement regarding the merit of student-focused instruction. The findings align with those of Flores et al. (2010) and Machost & Stains (2023), who contextualized the reflective practice as an ingredient of more thoughtful referrals to instructional decisions and enhanced student interest. The results also support the previous study conducted by Hashim et al. (2023), which argues that higher levels of resilience in teachers correlate with a higher degree of engagement in reflective practice, enabling them to be more adaptive and continuously refine their pedagogical skills.

The current study contributes to scholarly knowledge because it presents empirical evidence that supports the mutually reinforcing spontaneous learning, effect of resilience, reflective teaching practices. As previous researches findings examined these concepts separately. Teacher resilience may act as a foundational quality which enhances both serendipitous learning and reflective pedagogy, thereby improving overall teaching effectiveness and student outcome.

Recommendation

Regarding such findings, universities should consciously ensure that the environment becomes more conducive to unanticipated and spontaneous learning for both teachers and students. Moreover, any programs to enhance teacher resilience, as well as strategies to foster reflective pedagogy, will significantly augment the teaching power of serendipitous learning.

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