



AN EVALUATION OF A SELF-REGULATORY APPLICATION FOR THE EFFECTIVE MANAGEMENT OF STUDENTS' STUDY HABITS

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ABSTRACT

The academic performance of a student has a connection with his or her study habits. Existing research indicates that there is inadequate assessment of technology-based self-directed strategies implemented in self-study applications for effective management of students' learning habits. In this study, the case-based approach was adopted in the design of 'Study Pal', a self-regulatory mobile application implemented with strategies outlined in the Zimmerman cyclic model – forethought, performance, and reflection stages. An evaluation of the solution for efficacy recorded an 89% success rate using the cloud-based semi-automated tool – TestRail. The findings suggest that it is very effective at enhancing student study habits through self-regulated learning (SRL) strategies, guiding students in planning, executing, and reflecting on their study activities to develop good academic performance and higher self-regulation. It therefore confirms technological involvement in the capacity of SRL apps to enhance and assess students' study habits. Consequently, the study's findings not only contribute to the existing pool of knowledge in the domain but also foster motivation and engagement among students leading to improved academic performances. On the other hand, the study shades concern on the reflection features implemented which may benefit from additional features to improve the overall study outcome.

Keywords: Study habits, Academic performance, Self-regulatory, Educational anxiety, SRL strategies

INTRODUCTION

Self-regulation in habits developed towards learning is metamorphosed into better academic outputs; it helps to promote self-confidence in academic accomplishments and alleviates concerns about student learning habits at higher education levels (Breitwieser et al., 2023). However, the dependency on technological devices, particularly, smart (mobile) phones by students has proven to be associated with high irregularities in their study timelines, are the core indicators for educational anxieties saddling the efficacy of self-learning regulation in most tertiary institutions in Nigeria (Emeka et al., 2023). Efficacy in this regulation is indeed paramount and a matter of being self-disciplined and highly concentrating on one's study schedules apart from being able to control the urge to use technology frequently while studying (Melzner et al., 2020). Development of technology-based models, frameworks, and applications of integrated self-learning tools such as Trello or Microsoft Todo have been forecasted to motivate students and positively affect their to-do behavior (Stojanovic et al., 2018; Gilavand et al., 2019; Kim et al., 2019; Lobos et al., 2021; Susanti, 2021; Khiat & Vogel, 2022; Algiani et al., 2023; Breitwieser et al., 2023). However, their strategic impacts still lack adequate exploration. On studying strategies, Zhu et al. (2020) added that organized study habits and proper time management among students are supplementary to achieving better outcomes during the understanding of further effect of self-regulated learning strategies. Thus, these strategies position students in a self-directed discipline toward their academic goals, highlighting that the relationship between self-regulated learning (SRL) and academic performance is highly significant as substantiated by Coscos et al. (2022). SRL is an educational philosophy that allows desired study outcomes to be achieved by meeting personalized learning goals (Susanti, 2021; Coscos et al., 2022; Villalobos et al., 2022; Nurjanah, 2023). Consequentially, this personalization in their study habits increases competence and confidence in learning towards higher academic achievements.

Nonetheless, the self-efficiency expectation is unpredictable with the prevalence of technological distractions amid modern technologies in achieving an effective SRL outcome (Kim et al., 2019). Apparently, several technology-oriented task management applications exist in literary studies: On-SR UII (Pratama et al., 2022), Trello (Salakay & Shrivastava, 2024), Notion (Breitwieser et al., 2023), Todoist (Coscos et al., 2022), Study Pro (Lobos et al., 2021), with appropriateness to achieving better academic outcomes. These applications are productive in combining task management with schedules in such a way that organizes study materials into notes and allows for collaborative work among learners. Insights from the works by Baars et al. (2022) alarmed that the likes of Trello, Todoist, and Notion were more of task management and not necessarily designed to ace studies when engaged with students. Pratama et al (2022) substantiated this by adding that they lack features proposed by the Zimmerman model for SRL. Thus, the evaluation of Trello by Salakay and Shrivastava (2024) ascertained the concerns of Baars et al. (2022) and confirmed the need for a more model-based self-study system that would aid students in acing their studies while highlighting the lack of evaluation of these task management and learning technologies with respect to an SRL model.

The relationship between existing self-study applications and their effectiveness in regulating study attitudes and habits towards better academic achievement leaves a gap in research: that is, insights from literature revealed that there is a fall short in the actual evaluation of these technological approaches to ascertain the self-directed impacts in the effective management of students' learning habits (Baars & Ridderstap, 2022; Pratama et al., 2022; Salakay & Shrivastava, 2024). In this light, the present study attempts to offer a remedy for improved academic performance by proposing a self-regulatory application that aids in managing students' study habits effectively. The further objective of this study is to evaluate the resultant self-study application via a standard SRL model and report its effectiveness on student's

study habits, intentions, and learning outcomes using a suitable case study.

The findings and outcome of the study play a significant role in emphasizing the implementation of SRL strategies in self-study applications or systems to regulate students' attitudes and habits toward independent learning. The study contributes to the educational research domain while promoting self-efficacy, self-confidence, and self-directed learning habits among students of tertiary institutions thereby dissuading academic anxieties. The developed Study Pal artifact is most appropriate for students of tertiary institutions due to its efficacy in helping students go through all the phases of the SRL model to attain a better learning outcome.

The rest of the paper has been broken down into the following parts: Section 1.1 presents a review of existing literature and frameworks. Section 2 describes the methodology; Section 3 evaluates the proposed application for self-regulatory services and Section 4 concludes the paper.

Literature Review

In literature, the employment of modern technologies in regulating learners' attitudes towards self-guided study, especially by means of controlling their studying behaviors in relation to planned preferences through technology-based platforms on mobile devices has been highlighted with specific markings to learning habits, strategies, motivations and time management (Oliha, 2014; Kim et al., 2019; Baars & Ridderstap, 2022; Khiat & Vogel, 2022). There is no doubt that self-regulated models of learning are highly prevalent in the literature, as many studies dating back to two decades ago argue on theoretical frameworks and models essential for effective learning outcomes among students (Pintrich, 2004; Schunk & Zimmerman, 2007, Zimmerman, 2008). More so, the application of SRL frameworks/models to study habits was notably influenced by Zimmerman's cyclical model.

Emphasizing the views on SRL systems from literature, Pratama et al. (2022) noted that they can be desktop, mobile, or web based. The researchers inferred that a web-based SRL system can help students become more self-directed and decrease their fear of academic tides and educational anxieties. Substantiating the findings of Pratama et al. (2022), Baars et al. (2022) encouraged the use of mobile applications developed to ace individual study practice while the survey by Bembenutty (2023) advocates the establishment of a "computerized learning environment for helping the student with self-regulation in learning habit thereby minimizing educational anxiety". In the context of SRL systems, Jin et al. (2023) emphasized its backing through the application of artificial intelligence for behavioural regulation, while in "the application of guided inquiry model", Algiani et al. (2023) stressed that the SRL model fosters students' creative personalities and thinking abilities. In other recent studies, it was established that SRL applications can greatly help learners achieve self-coordination and independence in their study (Abenoja and Edig, 2023; Afzaal et al., 2024) if tailored towards standard SRL frameworks such as the Zimmerman cyclical model.

Pinpointing on student self-study, Baars et al. (2022) validated the idea of modelling SRL application after the cyclical model and also, mentioned other concepts such as Pintrich's framework for self-regulated learning; Winnie and Hadwins' information processing model that describes students' learning habits from forethought through performance up to reflection stages with cognitive (metacognitive), motivational and behavioural components. The importance placed on the Zimmerman model pinpoints the performance phase as the non-active but crucial stage

where events are in a partial ordering manner such that a happens-before relation is maintained. Zimmerman's SRL model divides learning habits into three steps, namely forethought, performance, and reflection. Each of these phases has an integral role for students in terms of how they control and improve their learning experiences (Baars & Ridderstap, 2022; Balogun et al., 2022; Jin et al., 2023).

In the first phase of forethought, every preparatory step before a student undertakes a studying task is outlined such that, students analyze their task of interest and set achievable goals for themselves. This phase encompasses cognitive tasks which transit to the next phase of performance. In the performance phase, students are actively involved in the process of learning with adopted strategies like focusing attention on specific details, imagery, and other techniques in controlling and monitoring their study habits. The performance phase is highly dependent on the forethought phase because it involves continuous monitoring and regulation of the cognitive activities during the study periods or sessions (Oliha, 2022a; Abenoja and Edig, 2023). It facilitates metacognitive operations that help adjust strategies for study habits to a particular task aimed at enhancing their overall productivity or effectiveness in self-regulated learning. The final phase is the reflection stage, where students review their performance and think about the study process of learning. In this phase, they look at their satisfaction with the results and evaluate how well they acted on it. This will aid them in recognizing strengths and areas for improvement and hence promoting a cycle of ongoing fine-tuning of study habits. The cognitive evaluation of the processes as well as outcomes is included in this phase alongside metacognitive reflections.

Summarizing background theories and literature, it is gathered that technological advancements through technology-based (mobile) applications have been pioneered as key indicators for enhancing study habits, achieving learning outcomes, and overcoming educational anxiety (Baars et al., 2022; Bembenutty, 2023; Jin et al., 2023). The effectiveness of this advancement in the use of mobile educational systems in combination with the SRL models (theoretical frameworks) highlights the impact of mobile applications in improving students' attitudes toward self-regulated study habits (Susanti, 2021; Khiat & Vogel, 2022; Nurjanah, 2023; Afzaal et al., 2024). This mobile application approach is embraced in this study as research has exposed its impact in significantly shaping and fostering regulated self-learning habits for tertiary students. Thus, subsequent sections discuss the methodological process of developing a self-regulatory application and its evaluation for the effective management of students' study habits.

MATERIALS AND METHODS

The case-based model approach is adopted in this study; Halida and Oktova (2022) asserted that it entails a sequential process with the initial selection of a case study, which is then developed in accordance with a standard model in the domain of interest. Oliha and Usiobaifo (2024) added that it is most suitable when tailored to addressing specific challenges targeted at a domain. Considering this approach, the study chose participants from the University of Benin for its case study and the Zimmerman SRL model for the intended solution. Given the approach, the study proposed and developed the SRL mobile application, codenamed Study Pal while adopting the components of the Zimmerman SRL cyclical model. The objective to evaluate the developed solution was core to the study and hence, the subsection discusses the strategy as shown in Figure 1.

Figure 1 is the framework adopted for evaluating the proposed SRL mobile application for effective study habits among students of tertiary institutions. Major components of the strategy are test plans, milestones, test runs, and test cases. A semi-automated evaluation was considered to implement the strategy allowing test cases to be manually developed according to test plans with configurations that support specific performativity evaluation of the target application

(Oliha 2022b; Oliha & Idehen, 2023). One automated tool capable of adequate management of these evaluation components is TestRail (Oliha, 2023; Oliha & Usiobaifo, 2024). TestRail is a cloud-based software quality engineering and assurance tool for quality assurance experts. Due to its support for test case management, the tool was selected as compared to JMeter, Jira, and Selenium.

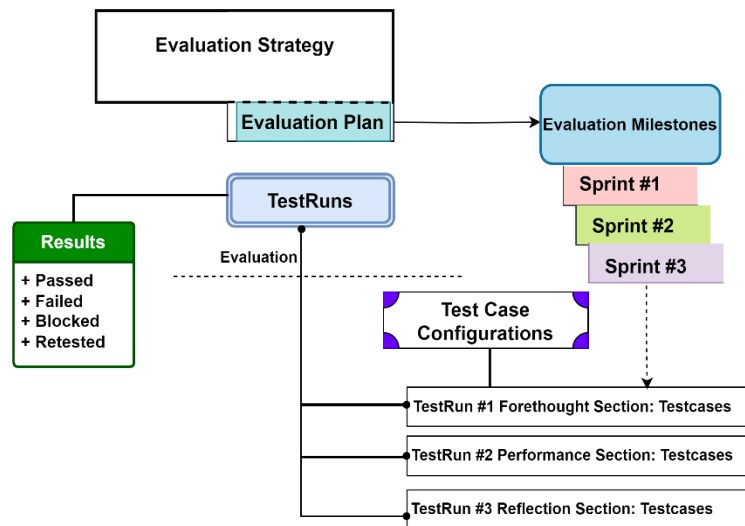


Figure 1: Evaluation Strategy

Configuration and Setup

Using the semi-automated tool, the test plan was configured with scenarios that aligned with the phases of the Zimmerman model: forethought, performance, and reflection as shown in Figure 2.

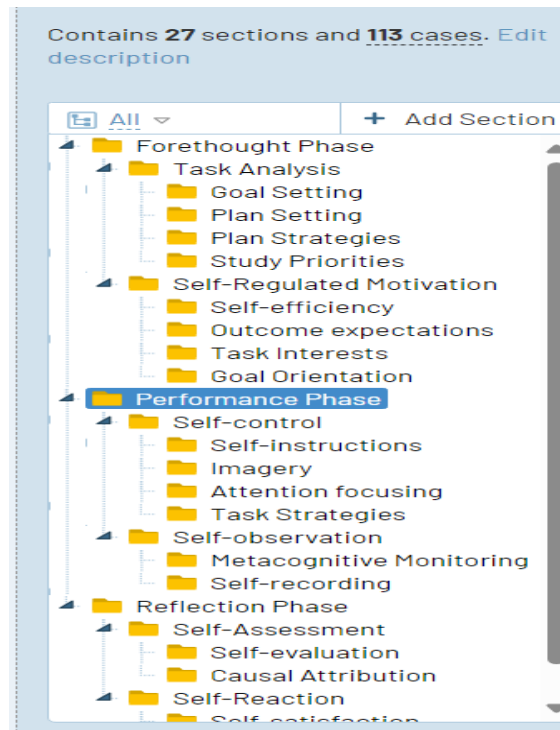


Figure 2: Test Orchestration

The test plan orchestrated 27 scenarios with 113 test cases designed across three phases of the Zimmerman SRL model as depicted in Figure 2. This structured approach ultimately allows for comprehensive evaluation. The scenarios simulate

real user experiences of the Study Pal mobile application, where users engage with the performativity features of the application and are then granted access to the post-usage evaluation portal to assess their perception and usage of the

SRL mobile application regarding their learning habits. Thus, the dashboard for the evaluation was first configured @ <https://studypalsrl.testrail.io/index.php?/dashboard> to enable a working environment on the test cases and scenarios developed for the plan.

The evaluation comprised 8 students at the University of Benin, who were participants in the exercise. According to

research, a minimum of 3 and a maximum of 15 is adequate for system evaluation and this justifies the number of evaluators for the study (Macfield, 2009; Oliha, 2021; Oliha and Iyoha, 2023). Depicted in Figure 3 is the evaluation plan – Test plan, abstracting the initial dashboard of the evaluation with test runs and a summary report of the intended evaluation outcomes.

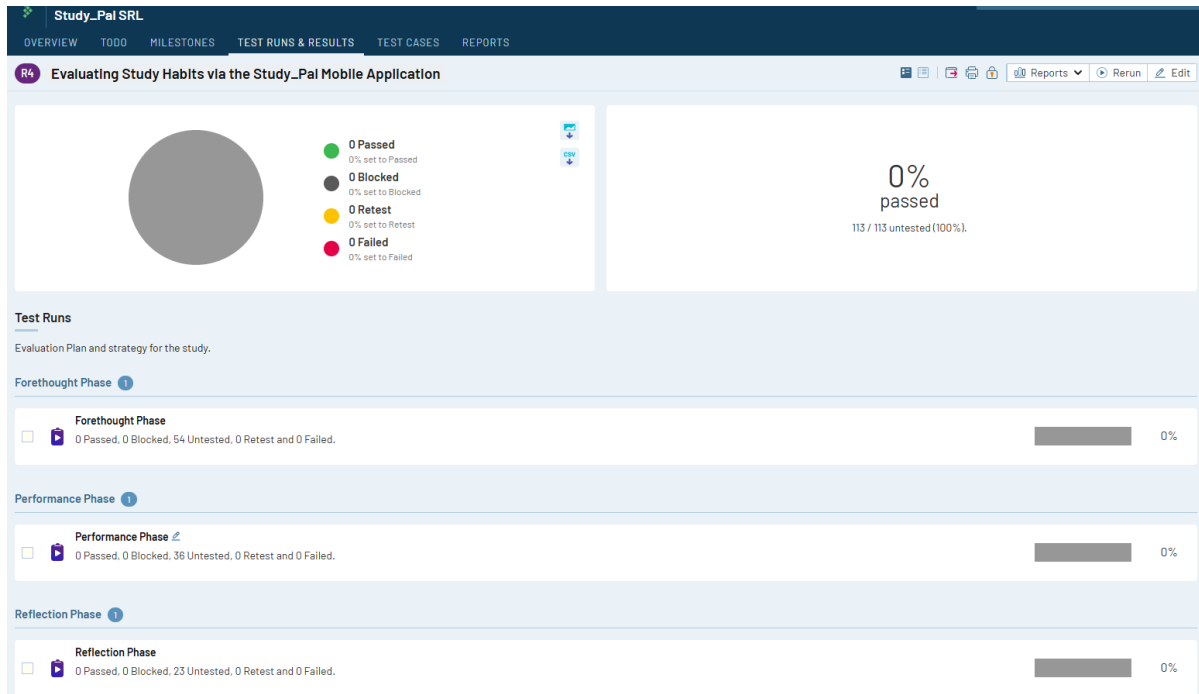


Figure 3: Evaluation Dashboard with Test Plan

Figure 4 shows that the evaluation project has a major milestone which includes the overall timeline and its completion status. The completion status of the main milestones displays 0% indicating the initial or planning stage of the evaluation which awaits timely completion with due

dates since there is no active Test Run. It further illustrates the project with three critical sub-milestones focused on different SRL evaluation phases, aligning with the concept of sprints, commonly used in agile methodologies.

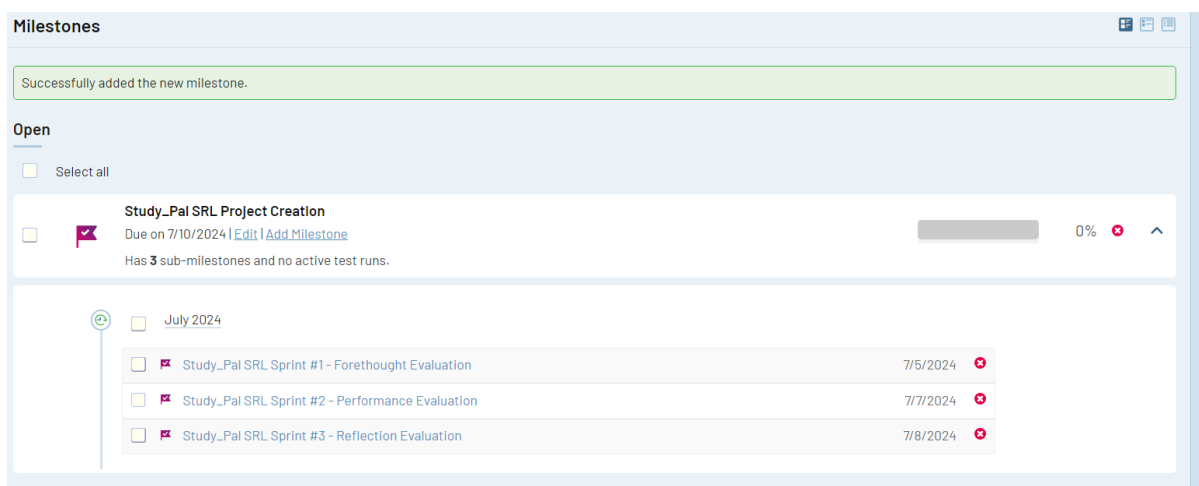


Figure 4: Project Milestones with Phases Configuration.

Illustrating the components of Figure 4, Sprint #1 entails the assessment of forethought activities. These involved the assessment of the Study Pal for goal setting, planning, goal orientation, self-motivation, and prioritization of the study session. Sprint #2 monitors the forethought activities. Self-directed and regulated strategies, attention focus, self-

observation, etc. are assessed here. Sprint #3 captures the reflective analysis of the self-assessment and self-evaluation processes in order to gauge self-satisfaction and causal relationships. The results of the evaluation are presented and discussed hereafter.

RESULTS AND DISCUSSION

Figure 5 is the summary result of the evaluation. Figure 5 (compared to Figure 3) is a snapshot of the combined reports

of the test evaluation of the SRL application for effectiveness in students' study habits.

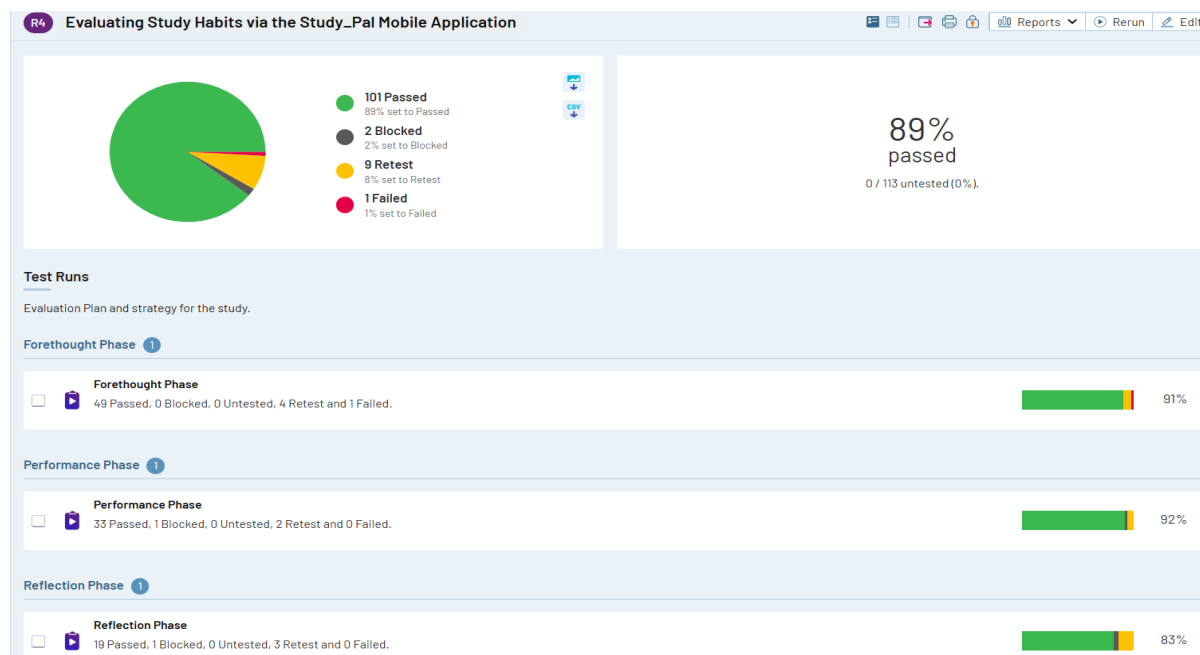


Figure 5: Evaluation Reports.

In Figure 5, the evaluation results for the forethought features resulted in a 91% success rate, which indicates that most students have been able to set their goals well and plan their study sessions accordingly via the Study Pal. Also, it is evident, with a 92% pass rate, that students can effectively engage in their study activities while utilizing the Study Pal app to observe and monitor their progress. The overall pass rate of 83% shows the ability of the students to assess their performance based on the goals they configured for themselves and reflect on their study behaviours and experiences. Summarizing the sub-milestones into a whole to gain a holistic insight, the overall success rate of the test plan revealed a weighted average of 89% passed cases accounting for 101 passed cases out of 113 total cases. This indication implies that a significant majority of the studying tasks were successfully completed by the students via the developed SRL application – Study Pal.

Discussing the evaluation outcome, the study's objective was to comprehensively assess the SRL mobile application's impact on self-regulated study habits among university students. Initially, it considered the case-based approach to gain insights into the case study and projected an SRL application codenamed Study Pal in line with the phases of the Zimmerman SRL cyclic model. To gather data for evaluation, the study employed a semi-automated test case management tool – TestRail to configure and set up the evaluation process according to plan and milestones. The milestones set for the study had a well-defined structure with a specific timeline, ensuring a systematic approach to the evaluation process as shown in Figure 4. Each sub-milestone targeted a specific phase of the SRL, permitting a thorough evaluation of critical components of SRL phases via the Study Pal application by the evaluators.

Reiterating Figure 4, initiating test runs was deemed necessary for the collection of data to assess the effectiveness of the Study Pal application. Doing so, the evaluation returned results with appropriate analysis by phases, visualizing the

true impact of the evaluated application with a success rate of 89% for better academic outputs. Figure 5 illustrates the evaluation results of the Study Pal mobile application, inferring that the framework of the SRL Study Pal is one integrated structured, and organized solution for students to effectively support their development of study habits. This outcome indicates that the evaluation tool with an overall passed rate of 89%, clearly defined the focused milestones at the forethought, performance, and reflection phases. The observed progress, maintaining adherence to the timeline, and test runs were all very important toward the attainment of desired outcomes, ensuring completeness and thorough evaluation as reported in related studies (Kim et al., 2019; Baars et al., 2022; Abenoja and Edig, 2023).

Key findings and contributions to existing knowledge highlight that: The overall pass rate shows that the study Pal application is effective in helping students to go through all the phases of SRL, with over 89% success rate. The highest pass rate among the three phases of SRL considered was observed in the performance phase, where it emerged at 92%, an indication that the Study Pal features and capabilities developed for monitoring and executing strategies are particularly effective. Significantly, the findings do not contradict existing studies; rather, they align with the work of Baars et al. (2022) on the proposition that SRL apps are designed to enhance and assess student study habits through the implementation of SRL strategies.

However, the notable study's limitation is that the result is confined to the case study and further work is recommended to extend the functionalities beyond the framework. Also, the reflection phase had the lowest success rate of 83%, which is below the excellent rate for an SRL app (Hayat et al., 2019; Oliha, 2021). This can be further enhanced by the inclusion of more features that can aid effective study habits in a way that helps support academic achievements and therefore reduce educational anxiety among learners.

CONCLUSION

The current study tested the Study Pal app as an intervention for enhancing students' study habits using SRL strategies. This app attained a high overall pass rate of 89%, peaking at 92% in the performance phase, one of the three SRL phases. The findings suggest that it is very effective at enhancing student study habits through SRL strategies, guiding students in planning, executing, and reflecting on their study activities to develop good academic performance and higher self-regulation. It therefore confirms technological involvement in the capacity of SRL apps in enhancing and assessing students' study habits. Further study is important to strengthen the phase of reflection to ensure the successful rate of self-assessment and reflective learning is high.

REFERENCES

- Abenoja, M. B. & Edig, M. M. N. (2023). Self-learning Module (SLM) Dimensions and Study Habits as Predictors of Academic Performance of Students in Mathematics. *EPRA International Journal of Environmental, Economics, Commerce and Educational Management*, 10(6), 27-32. <https://doi.org/10.36713/epra13681>
- Afzaal, M., Zia, A., Nouri, J. et al. (2024). Informative Feedback and Explainable AI-based Recommendations to Support Students' Self-Regulation. *Tech Know Learn*, 29, 331–354. <https://doi.org/10.1007/s10758-023-09650-0>
- Algiani, S. R., Artayasa, I. P., Sukarso, A. & Ramdani, A. (2023). Application of Guided Inquiry Model Using Self-Regulated Learning Approach to Improve Student's Creative Disposition and Creative Thinking Skill in Biology Subject. *Jurnal Penelitian Pendidikan IPA*, 9(1), 221–230. <https://doi.org/10.29303/jppipa.v9i1.2836>
- Baars, M., Khare, S. & Ridderstap, L. (2022a) Exploring Students' Use of a Mobile Application to Support their Self-regulated Learning Processes. *Front. Psychol.* 13, 1-18. <http://doi.org/10.3389/fpsyg.2022.793002>
- Baars, M., Zafar, F., Hrehovcsik, M., de Jongh, E. & Paas, F. (2022b). Ace Your Self-Study: A Mobile Application to Support Self-Regulated Learning. *Front. Psychol.* 13, 1-14. <http://doi.org/10.3389/fpsyg.2022.793042>
- Balogun N. A., Isimikalu M. I., & Adedoyin A. (2022). Students' Perception of Learning Management System on Students' Study Habit during Covid-19. *Fudma Journal of Sciences*, 6(6), 331 - 335. <https://doi.org/10.33003/fjs-2022-0606-1170>
- Bembenutty, H. (2023). Self-regulated Learning with Computer-Based Learning Environments. *Special Issue: Self-regulation of Learning with Computer-Based Learning Environments*. 174, 11-15. <https://doi.org/10.1002/tl.20543>
- Breitwieser, J., Nobbe, L., Biedermann, D., & Brod, G. (2023). Boosting Self-Regulated Learning with Mobile Interventions: Planning and Prompting help Children Maintain a Regular Study Routine. Center for Open Science, Preprint. <https://doi.org/10.31234/osf.io/e56tm>
- Coscos, R. M. M., Doncillo, J. A. D., Sausal, J. M., Tanquilan, M. C. M., Tumana, Jenyliza, S. R. S., & Uchang, T. (2022). Self-regulated Learning Strategies on Students' Academic Performance in Mathematics through Flexible Learning. *International Journal of Applied Science and Research*. 5(4), 26-40.
- Emeka, P.E., Okoza, J., Ukhurebor, K.E., Onwodi, G.O., Bayonle, F., & Nyagblordjro, J. (2023). The Impact of Internet Use on Tertiary Institution Students' Academic Performance: An Exploratory Study. *Cypriot Journal of Educational Science*. 18(1), 228-242. <https://doi.org/10.18844/cjes.v18i1.8144>
- Gilavand, A., Fattahi Asl, J., & Kameli, M. (2019). Investigating the Effect of Using the Mobile Educational App as Appropriate Method of Study and Learning on Students' Educational Achievement. *Future of Medical Education Journal*, 9(1), 25-29. <http://doi.org/10.22038/fmej.2019.36417.1239>
- Halida, E. M. & Oktova. R. (2022). Application of Case-Based Method in Postpartum Pre-Profession Courses to Improve Student Learning Outcomes. In Proceedings of the 4th International Conference on Educational Development and Quality Assurance (ICED-QA 2022). Advances in Social Science, Education and Humanities Research, Atlantis Press, pp. 149-152. <http://doi.org/10.2991/assehr.k.220303.028>
- Jin, S. H., Im, K., Yoo, M. et al. (2023). Supporting Students' Self-Regulated Learning in Online Learning Using Artificial Intelligence Applications. *International Journal of Education Technology High Educ.* 20(37), 132-137. <https://doi.org/10.1186/s41239-023-00406-5>
- Khiat, H., and Vogel, S. (2022). A Self-Regulated Learning Management System: Enhancing Performance, Motivation and Reflection in Learning. *Journal of University Teaching & Learning Practice*, 19(2), 43-59. <https://doi.org/10.53761/1.19.2.4>
- Kim, B., Lee, S. W., Hong, H. & Han, K. (2019). Automated Time Manager: Effectiveness of Self-Regulation on Time Management through a Smartphone Application," in *IEEE Access*, 7(1), 90891-90903, <https://doi.org/10.1109/ACCESS.2019.2926743>
- Lobos, K, Sáez-Delgado, F., Bruna, D., Cobo-Rendon, R., Díaz-Mujica, A. (2021). Design, Validity and Effect of an Intra-Curricular Program for Facilitating Self-Regulation of Learning Competences In University Students With The Support Of The 4planning App. *Education Sciences*. 11(8), 440-449. <https://doi.org/10.3390/educsci11080449>
- Macfield, R. (2009). How to Specify the Participant Group Size for Usability Studies: A Practitioner's Guide. *Journal of Usability Studies*. 5(1), 34-35.
- Melzner, N., Greisel, M., Dresel, M. et al. (2020). Regulating self-Organized Collaborative Learning: The Importance of Homogeneous Problem Perception, Immediacy and Intensity of Strategy Use. *Intern. J. Computing Support. Collaboration. Learning* 15, 149–177 <https://doi.org/10.1007/s11412-020-09323-5>
- Nurjanah, R. L. (2023). Self-regulated learning Strategy in Learning Activities of Literal Reading Course to Build Learning Independence. *SALEE: Study of Applied Linguistics and English Education*, 4(1), 296–314. <https://doi.org/10.35961/salee.v4i1.636>

- Oliha, F. O & Iyoha, P. O (2023). An Investigation of Selected Identity Management Agencies Towards a Unified National Registry System for Identity Services in Nigeria. *The Pacific Journal of Science and Technology*, 22(1), 68-76.
- Oliha, F. O. & Idehen, D. N. (2023). Software Testing: A Systematic Literature Study on Performance Evaluation Tools for Web Applications. In Proceedings of the 2023 Conference of the Society for the Advancement of ICT & Comparative Knowledge (SOCTHADICKconf'23), University of Ibadan, Ibadan, Oyo State, Nigeria, 29th October – 1st November 2023, pp. 6-18.
- Oliha, F. O. & Usiobaifo, A. R. (2024). Building Academic Integrity and Scholarly Reputation: An Emphasis on Institutional Repositories. *Benin Journal of Physical Sciences*, 1(1), 148-165.
- Oliha, F. O. (2014). Internet Social Activities and University Students' Study Habits: A Case Study of University of Benin", *International Journal of Electronics Communication and Computer Engineering*, 5(1), 197–200.
- Oliha, F. O. (2021). Evaluating Usability of Academic Web Portals for Social-Academic Learning. *The Pacific Journal of Science and Technology*, 22(1), 68-76.
- Oliha, F. O. (2022a). Assessing the Performability of A Fault Tolerant Architecture for Web Services Solution using Software Fault Injection. *International Journal of Computing and Digital Systems*. University of Bahrain, 12(1), 1243-1256. <https://dx.doi.org/10.12785/ijcds/120199>
- Oliha, F. O. (2022b). Guaranteeing performance in a fault-tolerant service-oriented architecture. *Journal of Information and Communication Technology*, Universiti Utara Malaysia. 21 (4), 595-625, <https://doi.org/10.32890/jict2022.21.4.6>
- Oliha, F. O. (2023). An automated tool-based performability assessment of selected e-government websites. *International Journal of Electronic Governance*, Inderscience 15(2), 151-168. <https://doi.org/10.1504/IJEG.2023.132350>
- Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16(4), 385-407.
- Pratama, A. R., Rahayu, P., Setiyadi, A., Azhar, M. F., & Ashshiddiq, M. F. (2022). On-Sr Uii: An Online Self-Regulated Learning Web Application to Assist Independent College Learners. *Jurnal Riset Informatika*, 4(4), 355–362. <https://doi.org/10.34288/jri.v4i4.380>
- Salakay, E., & Shrivastava, S. (2024). Exploring the Utility of Trello – An Alternative Learning Management System in Facilitating Problem-Based Learning in Medical Education. *The Indonesian Journal of Medical Education*, 13(1), 82-89. <https://doi.org/10.22146/jpki.87753>
- Schunk, D. H., & Zimmerman, B. J. (2007). Influencing Self-efficacy and Self-regulation. In *Motivation and Self-Regulated Learning: Theory, Research, and Applications*. Lawrence Erlbaum Associates, 127-152.
- Stojanovic, M., Grund, A., & Fries, S. (2020). App-based Habit Building Reduces Motivational Impairments during Studying - An Event Sampling Study. *Frontiers in Psychology*, Sec. Personality and Social Psychology. 11(1) 34-42. <https://doi.org/10.3389/fpsyg.2020.00167>
- Susanti, R. M. (2021). The Application of Self-Management Technique and the Improvement of Student's Learning Responsibilities. In Proceedings of the 2nd Annual Conference on Social Science and Humanities (ANCOSH 2020). Advances in Social Science, Education and Humanities Research, pp. 542, 27-30. <https://doi.org/10.2991/assehr.k.210413.007>
- Villalobos, E., Pérez-Sanagustin, M., Sanza, C., Tricot, A., & Broisin, J. (2022). Supporting Self-Regulated Learning in BL: Exploring Learners' Tactics and Strategies. Lecture Notes in Computer Science, 13450. Springer, Cham. https://doi.org/10.1007/978-3-031-16290-9_30
- Zhu, Y., Zhang, J.H., Au, W. et al. (2020). University Students' Online Learning Attitudes and Continuous Intention to Undertake Online Courses: A Self-Regulated Learning Perspective. *Education Tech Research Dev* 68, 1485–1519. <https://doi.org/10.1007/s11423-020-09753-w>
- Zimmerman, B. J. (2008). Investigating Self-Regulation and Motivation: Historical Background, Methodological Developments, and Future Prospects. *Am. Educ. Res. J.* 45, 166–183. <http://doi.org/10.3102/0002831207312909>
- Zimmerman, B. J. (2008). Self-regulated learning: Theories, Measures, and Outcomes. In *Handbook of Self-Regulation*, Academic Press, pp. 13-39.

