

From Lecture Hall to Pocket: ECO120 Notes - A Student's Best Friend?

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<https://doi.org/10.24191/gading.v27i0.523>

Received: 22 July 2024

Accepted: 28 August 2024

Date Published Online: 15 September 2024

Abstract: ECO120 Pocket notes, condensed summaries of key concepts, are increasingly used as a learning tool to enhance student engagement and understanding. In the context of economics education, these concise study aids have the potential to address common challenges such as information overload, difficulty in grasping complex concepts, and lack of motivation to revise regularly. This study investigates the effectiveness of ECO120 Pocket Notes, a specially designed set of pocket notes, in improving student learning outcomes in a Principles of Economics course. A pre- and post-survey design using a Google Form survey analysis was distributed to 83 students who enrolled in the Principles of Economics course at Universiti Teknologi MARA, Penang Campus. The statistical analysis of the findings was evaluated using Microsoft Excel software. Preliminary results indicate significant improvements in student understanding, interest, satisfaction, and test preparation. The results also suggest that the ECO120 Pocket Notes helped clarify complex concepts and made learning more enjoyable. This study highlights the potential of innovative learning tools like ECO120 Pocket Notes to bridge gaps in understanding and enhance academic performance in economics courses, with potential for broader applications in other disciplines.

Keywords: Economics, innovative learning, pocket notes, survey analysis, student performance

Introduction

The Malaysia Education Blueprint 2015-2025 has emphasised the need for innovative teaching and learning methods to equip students with the skills necessary for the 21st century. This shift towards 21st-century learning, emphasising creativity, collaboration, critical thinking, and communication (Voogt & Roblin, 2012), necessitates a departure from traditional "chalk and talk" methods and a greater focus on student-centred, active learning approaches. Economics courses play a crucial role in understanding and addressing societal challenges. However, the subject's inherent complexity, with its numerous theories, equations, and curves such as supply and demand curves, elasticity calculations, and economic theories, often poses a significant hurdle for students. Traditional teaching methods, which rely heavily on lectures and textbook readings, can make the subject seem dry, abstract, and inaccessible, leading to disengagement, frustration, and, ultimately, lower academic performance (Backenstoe, 2018). Moreover, he suggested innovative learning tools and teacher efficacy can enhance engagement and academic performance compared to traditional methods.

Furthermore, an outdated teaching technique causes many students who take economics courses to feel bored and uninterested in the material taught during the classes. If educators could use more efficient methods in their economics lessons, their students might be capable of understanding the material more effectively. The issue is that academics can teach differently than a decade ago; instead, they must undertake a paradigm shift to adapt to the numerous new teaching approaches in their teaching styles (Muslimin et al., 2017). To address these challenges and enhance student learning,

educators have been exploring innovative learning tools that leverage technology and active learning principles (Rollag & Billsberry, 2012). Such tools simplify complex concepts, provide opportunities for practice and application, and foster a deeper understanding of economic principles. Therefore, pocket notes' portability, conciseness, and ability to promote regular revision make them a promising learning tool. Their accessibility encourages spaced repetition, leading to better retention. The concise format promotes summarisation and understanding, while the compact size facilitates frequent review for knowledge consolidation.

Principles of Economics (ECO120) at UiTM provides foundational knowledge in microeconomics and macroeconomics. The course aims to equip students with analytical skills to understand and address economic issues, preparing them for advanced studies in economics and related fields. However, the Midterm Test in March 2023 revealed that many students scored in the lower grade ranges (F to D+), highlighting substantial difficulties in understanding the course material. Although there was improvement in March 2024, with more students achieving top grades (A and A+), the persistent inconsistency in middle-grade performance (C- to B+) remains an issue. Therefore, the ECO120 pocket notes cover page and preface, as shown in Figure 1, are designed specifically for a Principles of Economics course, representing a novel approach to enhancing student learning in this challenging subject. Besides, Cognitive Load theory (CLT) suggests that breaking down complex information into smaller, manageable chunks can improve comprehension and retention; these pocket notes provide concise summaries of key economic concepts, incorporating visual aids and helpful formulas to enhance understanding and application.

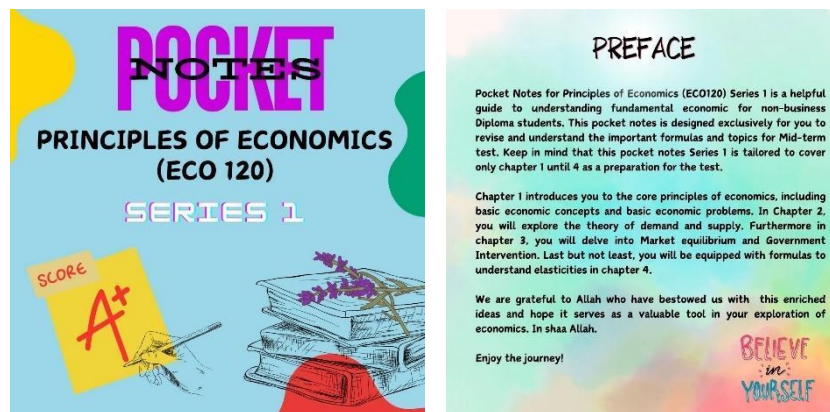


Fig. 1 Cover page and preface of ECO120 Pocket Notes

Thus, this study aims to investigate the students' perception of using ECO120 pocket notes in enhancing student learning and engagement in a Principles of Economics course. Specifically, this study seeks to answer the following research questions:

- i. Does the use of ECO120 pocket notes lead to improvements in student understanding of economic concepts?
- ii. Does using ECO120 pocket notes increase student engagement and motivation in the course?
- iii. What aspects of the ECO120 pocket notes can be improved based on student feedback to enhance their effectiveness as a learning tool?

By answering these questions, this study will contribute to the growing body of research on innovative learning tools in economics education and provide valuable insights for educators seeking to improve student learning outcomes in this vital field.

Literature Review

Cognitive Load Theory (CLT) provides a valuable framework for understanding the cognitive processes involved in learning and how instructional design can optimise learning outcomes.

According to CLT, working memory, where information is actively processed, has limited capacity (Sweller et al., 2019). A key principle within CLT focuses on presenting information in organised units, facilitating better understanding and retention of knowledge. Learning can be hindered when the cognitive load imposed by learning materials or tasks exceeds this capacity. Abbad et al. (2023) emphasised that humans may encounter challenges when processing complex information due to the limited capacity of working memory. This can lead to decreased performance and increased errors. The instructional strategies that reduce cognitive load and promote efficient processing can enhance learning. One way to reduce cognitive load is by breaking down complex information into smaller, more manageable chunks. This approach demonstrates that learners can better understand and remember information when presented in organised units (Cowan, 2001).

CLT emphasises the effectiveness of worked examples, where learners observe the step-by-step problem-solving process. Research by Moreno and Mayer (2007) also suggests that multimedia presentations incorporating narrated work examples can be particularly beneficial. Visual aids can effectively illustrate the problem-solving process, while the narration guides learners through the steps. This combination reduces the cognitive load of independently deciphering the problem and solution, promoting more profound understanding and retention. According to Azevedo and Garcia (2004) and Bethel and Mayer (2014), multimedia presentations that combine visual and auditory elements can be particularly effective for tasks requiring spatial reasoning or procedural learning. However, interactivity plays a crucial role. When learners can actively manipulate visual elements or engage with multimedia components, cognitive load can be reduced, and learning outcomes improve.

Therefore, Pocket notes, as a learning tool, align with CLT principles by presenting information in a concise, chunked format. They can incorporate visual aids, such as diagrams and summaries, to further reduce cognitive load. Recent studies have explored the effectiveness of pocket notes in various educational contexts. Zamri et al. (2021) asserted that the e-Pocket Note application is compatible with modern educational practices and serves as a catalyst for heightened student motivation and improved engagement between students and teachers, facilitating a more productive learning experience. Traditional note-taking methods often require dividing attention between listening and writing. Pocket notes can alleviate this by allowing learners to capture key points electronically, freeing up working memory for processing the lecture or reading material (Oakley, 2018).

Moreover, digital note-taking apps like Pocket Notes often offer features for organising and categorising information. This can facilitate the effective retrieval of key points later, reducing the need to rely on working memory for recall during learning activities (Azevedo & Carvalho, 2009). Some pocket note apps allow for integration with online resources and readings. Learners can easily link notes to specific textbook or lecture recording sections, enabling them to revisit relevant material quickly. This reduces the extraneous load associated with searching for information across multiple sources (Clark & Mayer, 2011).

The advent of digital technologies has transformed the learning landscape, with a growing body of research exploring the impact of these tools on student engagement. Studies have shown that interactive and engaging digital tools can enhance student motivation, participation, and overall learning experience (Mishra & Koehler, 2006). Past studies suggest that digital pocket notes can enhance learning outcomes. For instance, Liu et al. (2023) explored the effectiveness of digital note-taking apps in improving students' academic performance. Their findings indicated that students who utilised digital pocket notes demonstrated higher test scores than those who relied on traditional pen-and-paper note-taking. This suggests that digital notes' interactive features and organisation capabilities facilitate knowledge acquisition and retention.

Furthermore, the flexibility and accessibility of digital pocket notes can support personalised learning. Lee and Kim (2023) investigated how digital note-taking apps can accommodate diverse learning styles. Their study revealed that students with different learning preferences benefited from the customisable features of digital notes, such as highlighting, annotation, and multimedia integration. This indicates that digital pocket notes can cater to individual learning needs and promote active engagement.

Beyond learning outcomes, digital pocket notes can potentially enhance student engagement. Park and Choi (2023) examined the correlation between digital notetaking and students' motivation. Their results showed a positive association between using digital pocket notes and increased intrinsic

motivation, suggesting that digital notetaking's interactive and creative aspects can foster a more engaging learning experience. Moreover, digital pocket notes can facilitate collaborative learning. Kim and Lee (2023) investigated using digital note-taking apps for group projects. Their study demonstrated that students who collaborated on digital notes reported higher teamwork and satisfaction levels than those who used traditional note-taking methods. This suggests that digital pocket notes promote social interaction and knowledge sharing among students. While research on using specific digital tools like pocket notes in economics is limited, studies on other digital tools in higher education provide valuable insights. For example, research on learning management systems (LMS) has shown that effective use can increase student engagement and satisfaction (Bonk & Dennen, 2007). Therefore, this study aims to extend the existing literature by examining the impact of ECO120 pocket notes on student learning and engagement within a Principles of Economics course. Drawing upon Constructivist Learning Theory (CLT) and relevant prior research findings, this study seeks to contribute to the expanding body of evidence regarding the effectiveness of innovative educational tools in economics.

Methodology

This study investigated the students' perceptions of using ECO120 pocket notes to enhance student learning and engagement in a Principles of Economics course. Thus, this study utilises a quantitative survey approach, employing a questionnaire as the primary data collection tool. The target population consists of fourth-semester Diploma in Tourism Management students enrolled in the compulsory Principles of Economics course. A Google Form questionnaire, selected for its accessibility and flexible templates (Yusoff, 2024), was distributed to all 83 enrolled students. Moreover, Batubara (2017) found that students and lecturers liked using Google Forms to evaluate teachers' performance. They liked it because it was easy to access, saved time, and used less paper. The questionnaire comprises three sections: Part A focuses on respondent demographics, Part B assesses student perceptions of ECO120 pocket notes, and Part C solicits suggestions for pocket note enhancement.

Table 1. Distribution of Questionnaire Content

Section	Item	Number of Items
A	Respondent Demographics	6
B	Student Perceptions of ECO120 Pocket Notes	7
C	Suggestions for Pocket Note Enhancement.	1

In part B, respondents are required to answer questions using a Likert scale. They should respond based on their experience using pocket notes during the teaching and learning process or while reviewing economic subjects by marking the questionnaire according to the following levels.

Table 2. Likert Rating Scale

Score	Response Option
1	Strongly Disagree
2	Disagree
3	Not Sure
4	Agree
5	Strongly Agree

Descriptive statistics (such as frequency and percentage) were employed for data analysis. The research methodology flowchart (Figure 2) illustrates the eight-phase survey process: identifying the target population, determining the sample size using convenience sampling, designing the Google

Form questionnaire, distributing the form through course instructors, collecting responses within a specified timeframe, reviewing and cleaning the data, conducting descriptive statistical analysis, and presenting the findings using tables, graphs, or charts.

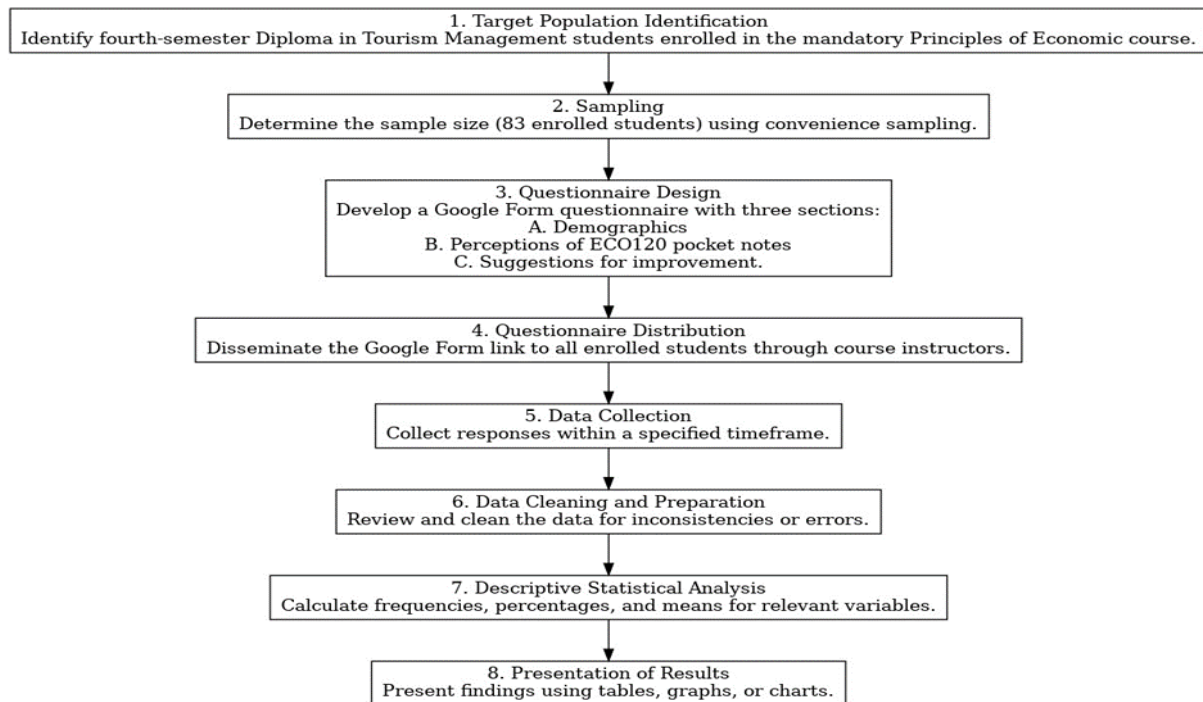


Fig. 2 Flow chart of research methodology

Findings and Discussion

This section presents the key findings from the study, focusing on the effectiveness of the ECO120 pocket notes in enhancing student learning and engagement in the Principles of Economics course. The findings are organized to reflect the students' demographic data, their experiences before and after using the pocket notes, and the overall impact on their academic performance. Additionally, student feedback on the pocket notes and recommendations for improvement are discussed to provide a comprehensive understanding of the tool's effectiveness.

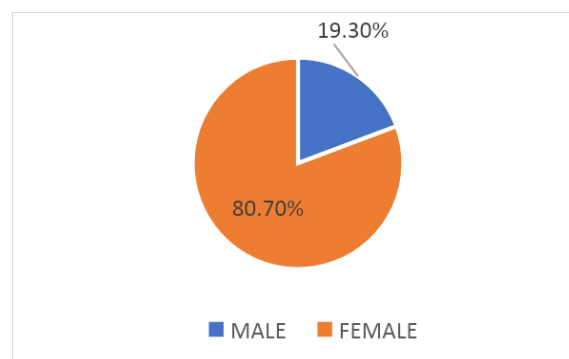


Fig. 3 Percentage of respondents' gender

Part A focuses on the respondent demographic, representing 83 study participants. As illustrated in Figure 3, the study cohort comprised 80.7% female students ($n = 67$) and 19.3% male students ($n = 16$) enrolled in this course. Figure 4 illustrates the distribution of respondents based on their prior exposure to economics in secondary school. A minority of respondents (30.1%, $n = 25$) reported having studied economics during their secondary education, while the majority (69.9%, $n = 58$) indicated no prior knowledge of the subject. This is probably due to most tourism management students not taking economics courses in secondary school because many secondary school curricula, especially those not specifically focused on business or economics, may not mandate economics as a compulsory subject. It might be offered as an elective, and students might prioritise other subjects they perceive as more aligned with their interests or future career paths in tourism. This could include subjects like geography, history, or foreign languages. Apart from that, economics is often perceived as a challenging subject that requires mathematical skills and abstract thinking. Students might be intimidated by this perception and opt for easier or more enjoyable subjects.

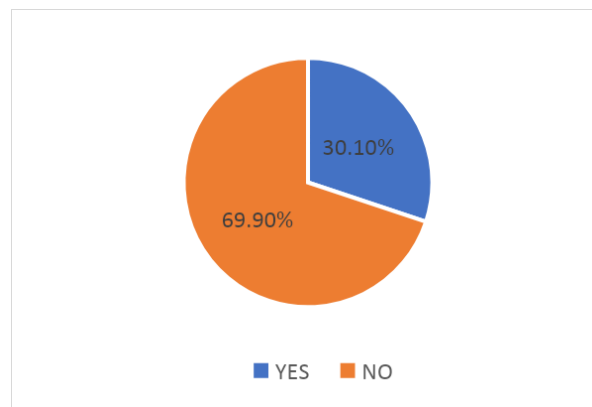


Fig. 4 Percentage of respondents with a background in economics from their secondary school studies

As for part B, Table 3 summarises respondents' experiences before using ECO120 Pocket Notes; students frequently needed help understanding fundamental economic concepts and often needed clarification on essential formulas. Their study sessions were usually disrupted due to the lack of concise and comprehensive reference materials, leading to increased anxiety as exams approached. Furthermore, respondents found remembering important definitions and economic theories challenging, frequently losing focus during study sessions and facing difficulties in accurately answering practice questions. However, after utilising ECO120 Pocket Notes, respondents experienced significant improvements. The notes provided a complete and easily accessible reference, facilitating a better understanding of economic concepts and more effective recall of formulas. Respondents reported increased confidence in remembering and understanding economic theories, which helped them study in a more organised and focused manner. As a result, it helps to reduce their anxiety and enhance their overall academic performance.

Table 3. Comparison of respondents' experiences before and after using ECO120 Pocket Notes

Aspect	Before Using ECO120 Pocket Notes	After Using ECO120 Pocket Notes
Understanding Concepts	Frequently struggled to grasp fundamental economic concepts	Found it much easier to understand economic concepts
Study Reference	Lack of concise and comprehensive reference materials	Easily accessible reference
Formula Recall	Often confused by essential economic formulas	Recall formulas much more effectively

Aspect	Before Using ECO120 Pocket Notes	After Using ECO120 Pocket Notes
Exam Anxiety	Felt anxious due to many concepts not understood	Reviewed more effectively, reducing anxiety
Definitions and Theories	Challenging to remember important definitions and economic theories	More confident in remembering and understanding economic theories
Study Focus	Often lost focus during study sessions	Studied in a more organized and focused manner

Meanwhile, Part C presents student perceptions and recommendations regarding the ECO120 Pocket Notes. Table 4 indicates that the feedback was overwhelmingly positive, with most respondents indicating that the notes helped enhance their understanding of economic concepts. The most frequently cited benefits included improved clarity of complex topics (mentioned by 25 students), increased engagement and enjoyment in learning (mentioned by 18 students), and greater confidence in test preparation (mentioned by 15 students). Specifically, students appreciated the concise format and accessible language of the pocket notes, highlighting the convenience of having key information readily available for quick revision. Including definitions and key sentences was also commended for improving clarity and comprehension. Notably, many students reported that the pocket notes made learning economics more enjoyable (8 responses), indicating that the notes aided academic understanding and fostered increased interest and engagement in the subject. Students also offered valuable suggestions for further improvement, most commonly requesting more detailed explanations and examples (25 mentions), the inclusion of visuals such as diagrams and charts (10 mentions), and extension of the notes to cover other chapters (8 mentions). A few students suggested adding music to enhance engagement, while others preferred a more concise format for specific sections.

Feedback exerts a profound influence on learning and achievement, potentially significantly enhancing or hindering progress (Hattie & Timperley, 2007). Firstly, the positive feedback on the pocket note design underscores the importance of aesthetic appeal in educational resources, which can stimulate interest and engagement among learners. This aligns with research indicating visually appealing materials can enhance motivation and attention (Fredricks & McColskey, 2012). The preference for the Flipbook format reflects a practical consideration for accessibility and ease of distribution, facilitating seamless access to educational content across different devices and platforms. This preference aligns with findings suggesting that enhancing online instruction and delivery methods through tailored content creation during flexible learning can significantly improve the effectiveness of teaching and learning processes (Ulanday et al., 2021). The suggestion to add music aims to leverage auditory learning modalities to enhance engagement and potentially improve student retention (Schellenberg & Mankarious, 2012). This aligns with research suggesting music can influence emotional states and cognitive processes, enhancing learning environments (Hallam, 2010).

Furthermore, the call for clear definitions and key sentences highlights a pedagogical concern for clarity and comprehension, advocating for precise explanations that aid in understanding complex concepts (Mayer, 2009). This suggestion resonates with educational principles emphasising the importance of clarity in instructional materials to support effective learning outcomes (Clark & Mayer, 2016). The recommendation for exercises with answers supports active learning approaches, encouraging students to apply theoretical knowledge to practical scenarios and promoting deeper understanding (Prince, 2004). Active learning strategies enhance engagement and promote higher-order thinking skills (Bonwell & Eison, 1991). Moreover, the desire for more detailed explanations and examples aligns with research emphasising their importance in fostering deeper comprehension and application of concepts (Hattie & Timperley, 2007).

Conversely, the preference for conciseness reflects the need for streamlined content that prioritises key concepts and improves readability, aligning with research highlighting its role in maintaining learner attention and facilitating efficient learning (Mayer, 2009; Clark & Mayer, 2016).

In addition, the suggestion to add more pocket notes for other chapters demonstrates a desire for comprehensive coverage of the subject matter, enabling deeper exploration and understanding across a broader range of topics. This aligns with educational principles emphasising the importance of comprehensive learning resources that address diverse aspects of a subject area (Bransford et al., 2000). In summary, these suggestions reflect a thoughtful approach to improving the ECO120 pocket notes, incorporating principles of engagement, accessibility, clarity, active learning, comprehensiveness, and multi-learning strategies. By integrating these insights, educators and instructional designers can enhance the effectiveness and appeal of educational materials, thereby fostering enhanced learning outcomes among students.

Table 4. Students' feedback and recommendations for ECO120 Pocket Note

Category	Positive Feedback	Suggestions for Improvement	Frequency
Design	Easy to download and access (PDF format)	Add music to enhance engagement	12
Content	Concise information that is easy to understand	Include definitions of key terms	15
Features	Pocket notes are helpful for quick revision	Provide exercises with answers for practical application	18
Additional Suggestions	Pocket notes have improved overall understanding of economic concepts	Include more detailed explanations and examples	25
	Pocket notes have made learning economics more enjoyable	Add more notes for other chapters	8
		Incorporate more visuals (e.g. diagrams, charts)	10
		Consider a more concise format for certain sections to improve readability	6

Moreover, Table 5 and Figure 5 highlight the differences in student achievement in Mid-term tests conducted in March 2023 and March 2024 across various grades. The data indicates that using ECO120 pocket notes can significantly improve Mid-term test performance. This is evident from the comparison, which shows an increase in the number of students achieving grades A- and above in March 2024 compared to March 2023. Before using ECO120 pocket notes only 3 respondents (7.1%) achieved an A grade before using ECO120 pocket notes, while 13 respondents (27.1%) achieved an A grade. Other than that, though middle-grade performance remains relatively consistent, there is a reduction in lower grades. In March 2024, no students scored E or below, compared to 4 students (9.5%) scoring E in March 2023, and the D and D+ grades were also eliminated in March 2024.

Table 5. Comparison of mid-term tests (March 2023 and March 2024)

Grade	Marks	Student Achievement			
		March 2023	% Grade	March 2024	% Grade
F	0-29	0	0	1	2.1
E	30-39	4	9.5	0	0.0
D	40-43	1	2.4	0	0.0

D+	44-46	3	7.1	0	0.0
C-	47-49	1	2.4	1	2.1
C	50-54	3	7.1	5	10.4
C+	55-59	4	9.5	2	4.2
B-	60-64	10	23.8	8	16.7
B	65-69	1	2.4	4	8.3
B+	70-74	7	16.7	8	16.7
A-	75-79	2	4.8	4	8.3
A	80-89	3	7.1	13	27.1
A+	90-100	3	7.1	2	4.2
TOTAL		42	100%	48	100%

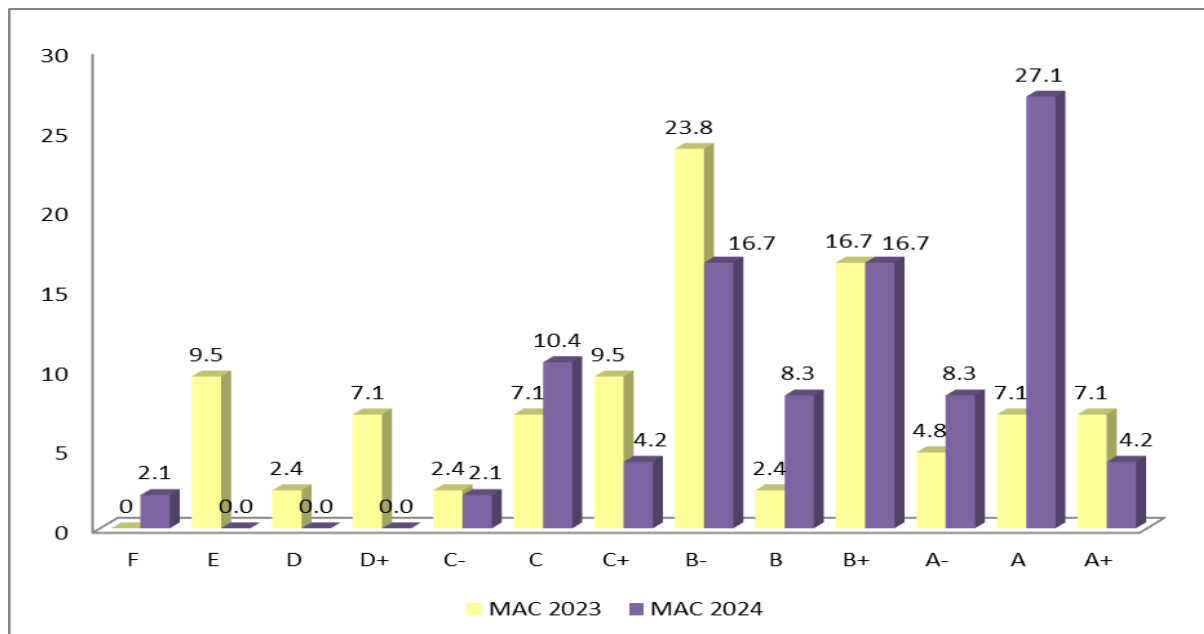


Fig. 5 Trend in student performance in mid-term test between March 2023 and March 2024

Conclusion

The study's findings reveal a marked transformation in students' learning experiences after adopting ECO120 pocket notes. Before their use, students reported grappling with fundamental economic concepts, experiencing difficulties with formula recall, and needing help maintaining focus during study sessions. These challenges hindered their understanding of key economic theories and contributed to increased anxiety surrounding examinations. However, after utilising the ECO120 pocket notes, students reported significantly improving their comprehension of core economic principles. The notes functioned as an accessible and comprehensive reference, facilitating conceptual understanding and formula retention. Students also expressed heightened confidence in their grasp and application of economic theories, leading to more focused and organised study habits. These improvements collectively resulted in reduced exam-related anxiety and an overall enhancement in

academic performance. The feedback provided by respondents in Part C, as shown in Table 4, underscores the importance of tailoring educational materials to diverse learning styles and preferences. The positive feedback regarding the pocket notes' design, coupled with the choice of the Flipbook format, emphasises the significance of aesthetics and accessibility in fostering student engagement and facilitating seamless content delivery. The suggestions for incorporating music and visual aids further highlight the potential of multi-sensory learning experiences in enhancing comprehension and retention. Moreover, the requests for more precise definitions, detailed explanations, and practical exercises underscore the need for comprehensive and engaging content that caters to various learning needs and preferences. By integrating these insights, educators and instructional designers can develop educational resources that impart knowledge, inspire curiosity and empower learners to actively engage with the subject matter, facilitating a more enriching and effective learning experience.

Suggestions for Future Research

The preliminary findings of this study regarding the perceptions of using ECO120 Pocket Notes underscore the need for further research in several key areas. A study tracking students' understanding and retention of economic concepts over an extended period is warranted to assess the longitudinal impact of Pocket Notes on student learning. A comparative study could evaluate the efficacy of Pocket Notes relative to other pedagogical tools and methodologies. Besides, gathering qualitative data through student interviews or focus groups could provide deeper insights into their learning experiences and perceptions of the Pocket Notes. Furthermore, future research should explore the potential for broader applications of Pocket Notes or similar condensed, interactive learning tools in other academic disciplines. Investigating the effectiveness of tailoring Pocket Notes to diverse learning styles could also enhance their pedagogical value. ECO120 Pocket Notes not only benefits students but also facilitates all economics lecturers. Besides, the simple and easily accessible features of these notes indirectly make economics lecturers more flexible and creative in conducting teaching and learning sessions. Therefore, for future studies, the views and opinions of economics lecturers will also be considered to make the content of ECO120 Pocket Notes more sustainable and innovative.

Co-Author Contribution

The authors confirmed that there is no conflict of interest in this article. Author 1 carried out the fieldwork and analysed and interpreted the results statistically. Author 2 wrote the research methodology, and Author 3 prepared the literature review.

Acknowledgements

The authors gratefully acknowledge Fakulti Pengurusan Hotel dan Pelancongan, Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang for supporting this research. Additionally, thanks to the reviewers' comments, Lecturer of Academy of Language Studies, UiTM Cawangan Melaka for their assistance in proofreading the academic writing of this paper.

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