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STUDENT SATISFACTION AND LEARNING OUTCOMES: A STUDY ON THE USE OF PROGRAMMING LANGUAGES FOR UNDERGRADUATES AT ABU-ISA FACULTY OF EDUCATION

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ABSTRACT

The researchers examined student satisfaction and learning outcomes regarding the use of programming languages for undergraduates at Abu-Isa Faculty of Education. The researcher employed a quantitative research methodology, collecting and analyzing numerical data to better understand the topic. Our aim was to comprehend students' positive and negative attitudes towards the effectiveness of studying programming languages, as well as their learning outcomes and suggestions for improving and developing programming language studies. The study revealed that students generally had a high level of positive attitudes towards the effectiveness of studying programming languages. It also investigated students' negative attitudes, which were similarly high. Additionally, the results indicated that the learning outcomes from studying programming languages were substantial. Finally, the study provided suggestions for improving and developing the study of programming languages.

Key Words: Attitudes, Learning Outcomes, Programming languages.

رضا الطلاب ومخرجات التعلم حول استخدام لغات البرمجة لدى طلاب المرحلة الجامعية في كلية التربية أبو عيسى

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الملخص:

يهدف البحث لقياس مدى رضا الطلاب ونتائج التعلم حول استخدام لغات البرمجة للطلاب الجامعيين في كلية التربية أبو عيسى. تم استخدام المنهج الكمي. وقام الباحث بجمع وتحليل الأرقام

والبيانات لفهم الموضوع بشكل أفضل. نريد أن نفهم اتجاهات الطلاب الإيجابية والسلبية حول فعالية دراسة لغات البرمجة. وكذلك التعرف على مخرجات تعلم الطلاب ومقترحاتهم لتحسين وتطوير دراسة لغات البرمجة. وأظهرت الدراسة أن مستوى اتجاهات الطلبة الإيجابية نحو فاعلية دراسة لغات البرمجة مرتفع بشكل عام. كما بحثت الدراسة في اتجاهات الطلاب السلبية حول فاعلية دراسة لغات البرمجة. والتي كانت مرتفعة أيضًا. بالإضافة إلى ذلك تشير النتائج إلى ارتفاع مستوى نواتج التعلم من دراسة لغات البرمجة. وأخيراً تقديم المقترحات لتحسين وتطوير دراسة لغات البرمجة.

الكلمات المفتاحية: اتجاهات الطلاب، مخرجات التعلم، لغات البرمجة.

Introduction:

In the rapidly evolving landscape of undergraduate education, the selection and utilization of programming languages play a pivotal role in shaping students' learning experiences and outcomes. As technology continues to permeate various fields, proficiency in programming languages has become increasingly essential for students pursuing degrees in diverse disciplines. Understanding the effectiveness of different programming languages from the perspective of undergraduate students is crucial for educators and institutions alike. This study aims to investigate student satisfaction and learning outcomes associated with the use of programming languages in undergraduate education, focusing specifically on the context of Abu-Isa Faculty of Education. By delving into students' perceptions, experiences, and achievements, this research seeks to provide valuable insights into optimizing the teaching and learning of programming languages within the undergraduate curriculum.

Definitions of Research Key terms:

C++ Programming Language:

C++ is a powerful and general-purpose programming language developed by Bjarne Stroustrup as an extension of the C language. It incorporates object-oriented programming (OOP) features like classes and inheritance, while also providing procedural programming capabilities (Stroustrup,1995). This versatility makes C++ a popular choice for demanding

applications such as game development, operating systems, and embedded systems (GeeksforGeeks. 2024). However, C++ can be more complex to learn due to its low-level control and memory management aspects (Rassokhin, 2020).

Java Programming Language:

Java is another widely used high-level programming language known for its platform independence and focus on object-oriented principles. Developed by Sun Microsystems (now Oracle), Java code is compiled into bytecode that can run on any platform with a Java Virtual Machine (JVM). This portability makes Java ideal for web applications, enterprise software, and mobile development (Rassokhin, 2020). Compared to C++, Java offers a more managed environment with automatic garbage collection and a focus on code safety (JavaTpoint, 2024).

Basic Programming Language:

"Basic" is a broad term encompassing several beginner-friendly programming languages designed to introduce core programming concepts. Early versions like BASIC (Beginner's All-purpose Symbolic Instruction Code) were popular for educational purposes due to their simple syntax and focus on fundamentals like variables, loops, and conditional statements. While not as widely used in professional development today, some modern variants of Basic like Visual Basic for Applications (VBA) are still employed for scripting and automation tasks (Rassokhin, 2020).

The choice between C++, Java, and a basic programming language depends on your goals. C++ offers power and flexibility for complex systems, while Java prioritizes portability and ease of use. Basic languages provide a gentle introduction to programming concepts.

Related Studies

Several studies have explored the correlation between programming language instruction, student satisfaction, and learning outcomes in undergraduate education. These studies provide valuable insights into the factors influencing students' experiences and achievements in programming courses.

(O'Reilly & O'Brien, 2018) conducted a comprehensive analysis of undergraduate students' perceptions of programming languages, emphasizing the importance of language selection in enhancing student engagement and comprehension. Their findings underscored the significance of aligning language choice with course objectives to optimize learning outcomes.

Similarly, (Jones & Smith, 2019) investigated the impact of different programming languages on student satisfaction and performance in introductory computer science courses. Through surveys and performance assessments, they identified varying levels of student preference and proficiency across programming languages, highlighting the need for tailored instructional approaches to accommodate diverse learning needs.

In a longitudinal study by (Patel et al., 2020), explored the longitudinal impact of programming language proficiency on students' academic and career success. Their findings revealed a positive correlation between mastery of specific programming languages and students' ability to secure internships and employment opportunities in the technology sector.

Moreover, (Smith & Johnson, 2017) conducted a qualitative investigation into students' experiences with programming language instruction, focusing on the perceived challenges and facilitators of learning. Through interviews and focus group discussions, they identified key factors such as instructor expertise, course materials, and peer collaboration that significantly influenced students' satisfaction and learning outcomes.

Additionally, a meta-analysis by (Brown et al., 2016) synthesized findings from multiple studies to examine the overall effectiveness of different pedagogical approaches in teaching programming languages to undergraduate students. Their analysis revealed significant variability in instructional methods and outcomes, highlighting the need for further research to establish best practices in programming language education.

These studies collectively contribute to our understanding of the complex interplay between programming language instruction, student satisfaction, and learning outcomes in undergraduate education. By synthesizing existing research and addressing gaps in the literature, the current study aims to provide additional insights into this important area of inquiry.

Statement of the Problem

In contemporary undergraduate education, the effectiveness of programming languages as instructional tools has come under scrutiny due to two prominent issues. Firstly, the perception persists that programming languages are antiquated and excessively time-consuming, posing significant challenges to student learning and engagement. Secondly, there is a prevailing concern that existing programming language instruction does not adequately prepare students to design software applications, thereby limiting their practical skills and employability in the software development industry.

These dual challenges raise critical questions about the relevance and efficacy of programming language education in meeting the evolving needs of undergraduate students and the broader technological landscape. Addressing these issues is imperative to ensure that programming language instruction aligns with students' learning preferences, educational goals, and future career prospects.

Research Objectives:

This research aims at:

1- Exploring the students' positive and negative attitudes about the effectiveness of studying programming languages.

2- Investigating the learning outcomes achieved by students by studying programming languages.

3- Provide suggestions for improving and developing the study of programming languages.

Research Questions

1- What are the students' positive and negative attitudes towards the effectiveness of studying programming languages?

2- What are the learning outcomes associated with studying programming languages?

3- What suggestions and recommendations are directed to students to improve and develop the study of programming languages?

Methodology of the study

In this study, the researcher found out what student satisfaction and learning outcomes on the Use of programming languages for undergraduates at Abu-Isa Faculty of Education. The researcher asked 40 students who were currently at Zawia University in 2024 about their thoughts on this topic.

The researcher used quantitative data collection. This means that the researcher collected and analyzed numbers and figures to understand the topic in a profound way. The researcher wanted to understand the students' positive and negative attitudes towards the effectiveness of studying programming languages as well as understanding the students' learning outcomes and suggestions for improving and developing the study of programming languages.

To do this, the researcher created a questionnaire, which had 20 Lickert Scale questions. The questionnaire had four parts. The first and second parts asked about the students' positive and negative attitudes towards the effectiveness of studying programming language, the third section asked about

the students' learning outcomes from studying programming languages, and the fourth section investigated any suggestions for improving and developing the study of programming languages. The researcher employed a 5-point scale to rate the answers: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

Reliability

The study's questionnaire was tested for reliability by using Cronbach's Alpha. Also the four sections of the questionnaire were tested and the result is shown in the table 1 below.

Table 1. Cronbach' Alpha Consistency

	Number of Statement	Cronbach' Alpha Coefficient
Positive Attitudes	5	0.735
Negative Attitudes	5	0.812
Learning Outcomes	5	0.901
Improvement	5	0.702

As shown above, all sections with Cronbach coefficient are greater than 0.60. Hence the questionnaire is considered reliable.

Statistical Analysis Instruments

The Statistical Package for Social Sciences (SPSS V23) was used to analyze the data in order to assess the responses of the study sample. Descriptive statistics analyzed included frequency tables, arithmetic mean, and standard deviation.

The Measure of the Materiality of the Arithmetic Mean

An ordinal scale was developed for the arithmetic mean according to its level of importance, to be used in analyzing the results according to the following on the table 2:

Table 2: The Measure of the Materiality of the Arithmetic Mean

Materiality	Arithmetic Mean
Very Low	1-1.79
Low	1.8-2.59
Moderate	2.6-3.39
High	3.4-4.19
Very High	4.2-5

Table 3: Descriptive Analysis for Students' positive attitudes about the effectiveness of studying programming languages

Statement		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Mean	standard deviation	Level	Rank
Q1. The use of programming languages in my courses enhances my interest in learning?	N	14	20	5	0	1	4.15	0.834	High	3
	%	35	50	12.5	0	2.5				
Q2. I feel confident in my ability to learn and apply programming concepts?	N	6	30	3	0	1	4.00	0.679	High	4
	%	15	75	7.5	0	2.5				
Q3. The	N	11	25	4	0	0	4.18	0.594	High	2

instructors effectively engage students in programming activities?	%	27.5	62.5	10	0	0				
Q4. I believe that learning programming languages will benefit my future career prospects?	N	19	17	2	1	1	4.30	0.883	High	1
	%	47.5	42.5	5	2.5	2.5				
Q5. I enjoy the challenge of solving programming problems?	N	7	21	8	2	2	3.73	0.987	High	5
	%	17.5	52.5	20	5	5				
All Statements							4.07	0.563		

Table (3) shows that all the means that measure the level of Students' positive attitudes about the effectiveness of studying programming languages. The responses are from 3.73 to 4.30 which implies that the level is high. The statement that says "I believe that learning programming languages will benefit my future career prospects" ranked first with a mean of 4.30 and a standard deviation of 0.883 which demonstrates that the level is high. While the

statement that says “I enjoy the challenge of solving programming problems” ranked last with a mean of 3.73 and a standard deviation of 0.987 which indicates that the level is also high. In addition, it can be seen that the overall mean is equal to 4.07 with a standard deviation of 0.563. This indicates that the level of responses to the Students’ positive attitudes about the effectiveness of studying programming languages is generally high.

Table (3) shows that:

1) 2.5% of the study sample strongly disagreed that they see the use of programming languages in their courses enhances their interest in learning, 12.5% of the study sample were neutral. While 50% of the study sample agreed that they see the use of programming languages enhances their interest in learning and 35% of the sample strongly agreed. It can be noted that 85% which is the majority of the sample agreed that they see the use of programming languages enhances their interest in learning.
2) 2.5% of the study sample disagreed that they feel confident in their ability to learn and apply programming concepts and 7.5% of the study sample were neutral. However, 75. % of the study sample agreed and 15% of the sample strongly agreed that they feel confident in their ability to learn and apply programming concepts. This indicates that 90% which is the majority of sample agreed that they feel confident in their ability to learn and apply programming concepts.
3) 10% of the study sample was neutral that instructors effectively engage students in programming activities, 62.5% of the study sample were agreed that. Furthermore, and 27.5% of the sample strongly agreed that instructors effectively engage students in programming activities. It can be noted that 90% which is the majority of the sample agreed that instructors effectively engage students in programming activities.

4) 2.5% of the participants strongly disagreed that learning programming languages will benefit their future career prospects, 2.5% of the study sample disagreed and 5% of the study sample were neutral. Furthermore, 42.5% of the study sample agreed that and 47.5% of the sample strongly agreed that learning programming languages will benefit their future career prospects. It can be mentioned that 90% which is the majority of the sample agreed that learning programming languages will benefit their future career prospects.

5) Only 5% of the study sample strongly disagreed that they enjoy the challenge of solving programming problems and 5% of the study sample disagreed. However, 20% of the study sample was neutral that and 52.5% of the sample agreed. While 17.5% of the study sample strongly agreed that they enjoy the challenge of solving programming problems. It can be noted that 70% which is more than half of the sample agreed that they enjoy the challenge of solving programming problems.

Table 4: Responses to the Students' Negative Attitudes about the effectiveness of studying programming languages

Statement		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Mean	standard deviation	Level	Rank
Q6. I find programming courses	N	5	5	7	18	5	2.68	1.228	moderate	4
	%	12.5	12.5	17.5	45	12.5				

overwhelming and stressful?										
Q7. The pace of the programming courses is too fast for me to keep up?	N	4	17	12	6	1	3.43	0.958	High	2
	%	10	42.5	30	15	2.5				
Q8. I often feel frustrated when working on programming assignments?	N	4	9	6	17	4	2.80	1.203	moderate	3
	%	10	22.5	15	42.5	10				
Q9. I struggle to understand complex programming concepts?	N	3	9	7	19	2	2.80	1.091	moderate	3
	%	7.5	22.5	17.5	47.5	5				
Q10. I feel that the programming curriculum lacks proper	N	7	22	3	7	1	3.68	1.047	High	1
	%	17.5	55	7.5	17.5	2.5				

support and resources?										
All Statements							3.07	0.838		

Table (4) shows that all the means that measure the level of the students' negative attitudes towards the effectiveness of studying programming languages. The responses are from 2.68 to 3.68 which implies that the level is high. The statement which says “I feel that the programming curriculum lacks proper support and resources” ranked first with a mean of 3.68 and a standard deviation of 1.047 which demonstrates that the level is high. While the statement that says “I find programming courses overwhelming and stressful” ranked last with a mean of 2.68 and a standard deviation of 1.228 which indicates that the level is also high. In addition, it can be seen that the overall mean is equal to 3.07 with a standard deviation of 0.838. This indicates that the level of responses to the students’ negative attitudes about the effectiveness of studying programming languages is generally high.

Table (4) shows that:

1) 12.5% of the study sample strongly disagreed that they find programming courses overwhelming and stressful, 45% of the study sample disagreed. While 17.5% of the study sample was neutral and 12.5% of the sample agreed. 12.5% of the sample strongly agreed. It can be noted that 57.5% which is the majority of the sample disagreed that they find programming courses overwhelming and stressful.
2) 2.5% of the study sample strongly disagreed that they pace of the programming courses is too fast for them to keep up and 15% of the study sample disagreed and 30% of the study sample were neutral. However, 42.5% of the study sample agreed and 10% of the sample strongly agreed that they pace of the programming courses is too fast for them to keep up.

This indicates that 52.5% which is more than half of the sample agreed that the pace of the programming courses is too fast for them to keep up.

3) 10% of the study sample strongly disagreed that they often feel frustrated when working on programming assignments, 42.5% of the study sample disagreed and 15% of the study sample was neutral. Furthermore, 22.5% of the study sample agreed that and 10% of the sample strongly agreed that that they often feel frustrated when working on programming assignments. It can be mentioned that 52.5% which is more than half of the sample disagreed that they often feel frustrated when working on programming assignments.
4) 5% of the study sample strongly disagreed that they struggle to understand complex programming concepts, 47.5% of the study sample disagreed and 17.5% of the study sample were neutral. Furthermore, 22.5% of the study sample agreed that and 7% of the sample strongly agreed that they struggle to understand complex programming concepts. It can be mentioned that 52.5% which is more than half of the sample disagreed that they struggle to understand complex programming concepts.
5) 2.5% of the study sample strongly disagreed that feel that the programming curriculum lacks proper support and resources and 17.5% of the study sample were disagreed .and 7.5% of the study sample neutral. However, 55% of the sample agreed. and 17.5% of the study sample strongly agreed that feel that the programming curriculum lacks proper support and resources. It can be noted that 72.5% which is the majority of the sample agreed that the programming curriculum lacks proper support and resources.

Table 5: Responses to the learning outcomes from studying programming languages

Statement		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Mean	standard deviation	Level	Rank
Q11. I feel that I have gained a solid understanding of programming languages?	N	8	18	10	2	2	3.70	1.018	High	5
	%	20	45	25	5	5				
Q12. The programming courses have helped me develop problem-solving skills?	N	8	24	3	3	2	3.83	1.010	High	3
	%	20	60	4.5	7.5	5				
Q13. I can apply programming concepts in real business areas?	N	9	20	6	3	2	3.78	1.050	High	4
	%	22.5	50	15	7.5	5				
Q14. My thinking skills improved by learning programming languages?	N	8	24	4	3	1	3.88	0.911	High	2
	%	20	60	10	7.5	2.5				
Q15. I am satisfied with the	N	15	18	2	3	2	4.03	1.097	High	1
	%	37.5	45	5	7.5	5				

learning results achieved in studying programming languages?										
All Statements							3.84	0.861		

Table (5) shows that all the means that measure the level of the learning outcomes from studying programming languages. The responses are from 3.70 to 4.03 which implies that the level is high. The statement that says "I am satisfied with the learning results achieved in studying programming languages" ranked first with a mean of 4.03 and a standard deviation of 1.097 which demonstrates that the level is high. While the statement which says "I feel that I have gained a solid understanding of programming languages" ranked last with a mean of 3.70 and a standard deviation of 1.018 which indicates that the level is also high. In addition, it can be seen that the overall mean is equal to 3.84 with a standard deviation of 0.861. This indicates that the level of responses to the learning outcomes from studying programming languages is generally high.

Table (5) shows that:

1) 5% of the study sample strongly disagreed that they feel have gained a solid understanding of programming languages, 5% of the study sample disagreed. While 25% of the study sample showed neutral attitudes and 45% of the sample agreed. 20% of the sample strongly agreed. It can be noted that 65% which is more than half of the sample agreed that they feel have gained a solid understanding of programming languages.
2) 5% of the study sample strongly disagreed that the programming courses have helped me develop problem-solving skills and 7.5% of the study sample disagreed and 4.5% of the study sample was neutral. However,

60% of the study sample agreed and 20% of the sample strongly agreed that the programming courses have helped me develop problem-solving skills. This indicates that 80% which is the majority of the sample agreed that the programming courses have helped me develop problem-solving skills.

3) Only 5% of the study sample strongly disagreed that they can apply programming concepts in real business areas, 7.5% of the study sample disagreed and 15% of the study sample were neutral. Furthermore, 50% of the study sample agreed that and 22.5% of the sample strongly agreed that they can apply programming concepts in real business areas. It can be mentioned that 72.5% which is the majority of the sample agreed that they can apply programming concepts in real business areas.
4) Merely 2.5% of the study sample strongly disagreed that they thinking skills improved by learning programming languages, 7.5% of the study sample disagreed and 10% of the study sample were neutral. Furthermore, 60% of the study sample agreed that and 20% of the sample strongly agreed that they thinking skills improved by learning programming languages. It can be mentioned that 80% which is the majority of the sample agreed that they thinking skills improved by learning programming languages.
5) 5% of the study sample strongly disagreed that they satisfied with the learning results achieved in studying programming languages and 7.5% of the study sample were disagreed .and 5% of the study sample neutral. However, 45% of the sample agreed. and 37.5% of the study sample strongly agreed that they satisfied with the learning results achieved in studying programming languages. It can be noted that 82.5% which is the majority of the sample agreed that they satisfied with the learning results achieved in studying programming languages.

Table 6: Responses to the Suggestions for improving and developing the study of programming languages

Statement		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Mean	standard deviation	Level	Rank
Q16. There should be more hands-on programming exercises during classes?	N	13	18	9	0	0	4.10	0.744	High	4
	%	32.5	45	22.5	0	0				
Q17. Additional tutoring or support sessions should be provided for struggling students?	N	22	13	5	0	0	4.43	0.712	High	1
	%	55	32.5	12.5	0	0				
Q18. The curriculum should be revised to include more practical examples and projects?	N	16	21	2	1	0	4.30	0.687	High	2
	%	40	52.5	5	2.5	0				
Q19. More feedback should be given on programming assignments to aid	N	13	25	2	0	0	4.28	0.554	High	3
	%	32.5	62.5	5	0	0				

understanding?										
Q20. Presentations of workshops or seminars on programing languages to students would be beneficial?	N	17	18	5	0	0	4.30	0.687	High	2
	%	42.5	45	12.5	0	0				
All Statements							4.28	0.459		

Table (6) shows that all the means of the suggestions for improving and developing the study of programming languages. The responses are from 4.10 to 4.43 which implies that the level is high. The statement that says “Additional tutoring or support sessions should be provided for struggling students” ranked first with a mean of 4.43 and a standard deviation of 0.712 which demonstrates that the level is high. While the statement which says “There should be more hands-on programming exercises during classes” ranked last with a mean of 4.10 and a standard deviation of 0.744 which indicates that the level is also high. In addition, it can be seen that the overall mean is equal to 4.28 with a standard deviation of 0.459. This indicates that the level of responses to the suggestions for improving and developing the study of programming languages is generally high.

Table (6) shows that:

1) 22.5% of the study sample was neutral that there should be more hands-on programming exercises during classes. However, 45% of the study sample agreed and 32.5% of the sample strongly agreed that there should be more hands-on programming exercises during classes. This indicates

that 77.5% which is the majority of the sample agreed that there should be more hands-on programming exercises during classes.

2) 12.5% of the study sample neutral that additional tutoring or support sessions should be provided for struggling students, 32.5% of the study sample agreed. Furthermore, 55% of the study sample strongly agreed that additional tutoring or support sessions should be provided for struggling students. It can be mentioned that 82.5% which is the majority of the sample agreed that additional tutoring or support sessions should be provided for struggling students.
3) 2.5% of the study sample disagreed that the curriculum should be revised to include more practical examples and projects, 5% of the study sample was neutral. While 52.5% of the study sample agreed and 40% of the sample strongly agreed. It can be noted that 92.5% which is the majority of the sample agreed that the curriculum should be revised to include more practical examples and projects.
4) 5% of the study sample was neutral that more feedback should be given on programming assignments to aid understanding. However, 62.5% of the study sample agreed and 32.5% of the sample strongly agreed that more feedback should be given on programming assignments to aid understanding. This indicates that 95% which is the vast majority of the sample agreed that more feedback should be given on programming assignments to aid understanding.
5) 12.5% of the study sample was neutral that presentations and workshops or seminars on specific software applications to students would be beneficial. However, 45% of the sample agreed. and 42.5% of the study sample strongly agreed that presentations of workshops or seminars on specific software applications to students would be beneficial. It can be noted that 87.5% which is the majority of the sample agreed that presentations of

workshops or seminars on programing languages to students would be beneficial.

Conclusion and Discussion

The idea of this research emerged after reviewing many previous studies. where, several studies have explored the correlation between programming language instruction, student satisfaction, and learning outcomes in undergraduate education The study aimed to provide additional insights into this important area of inquiry. Where the study concluded to that students generally have a high level of positive attitudes about the effectiveness of studying programming languages. with 90% believing that learning programming languages will benefit their future career prospects. Likewise, with a study by Patel et al, revealed a positive correlation between mastery of programming languages and students' ability to secure employment opportunities in the technology sector. The study also investigated students' negative attitudes, where 72.5% of the students feeling that the programming curriculum lacks proper support and resources. This converges with a study conducted by Jones and Smith that highlighting the need for tailored instructional approaches to accommodate diverse learning needs. Furthermore, Smith and Johnson identified key factors such as instructor expertise, course materials, and peer collaboration that significantly influenced students' satisfaction and learning outcomes. Interestingly, the study indicate that the learning outcomes from studying programming languages are high, with 82.5% of the students satisfied with the learning results they achieved. Finally, the study provided suggestions for improving and developing the study of programming languages, with 82.5% of the students recommending that additional tutoring or support sessions should be provided for struggling students.

Recommendations

This study focused on providing useful recommendations about the suggestions for improving and developing the study of programming languages. This study recommends the following:

1- There should be more hands-on programming exercises during classes.
2- The additional tutoring or support sessions should be provided for struggling students.
3- The curriculum should be revised to include more practical examples and projects.
4- More feedback should be given on programming assignments to aid understanding.
5- Presentations, workshops and seminars on programing languages to students would be beneficial for students.

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