

Compet

International Teaching Aid

Reconnoitering Innovative Ideas in Postnormal Times

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2023

itac 2023 INTERNATIONAL TEACHING AID COMPETITION E-PROCEEDINGS

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# PREFACE

iTAC or International Teaching Aid Competition 2023 was a venue for academicians, researchers, industries, junior and young inventors to showcase their innovative ideas not only in the teaching and learning sphere but also in other numerous disciplines of study. This competition was organised by the Special Interest Group, Public Interest Centre of Excellence (SIG PICE) UiTM Kedah Branch, Malaysia. Its main aim was to promote the production of innovative ideas among academicians, students and also the public at large.

In accordance with the theme "Reconnoitering Innovative Ideas in Post-normal Times", the development of novel ideas from the perspectives of interdisciplinary innovations is more compelling today, especially in the post-covid 19 times. Post-pandemic initiatives are the most relevant in the current world to adapt to new ways of doing things and all these surely require networking and collaboration. Rising to the occasion, iTAC 2023 has managed to attract more than 267 participations for all categories. The staggering number of submissions has proven the relevance of this competition to the academic world and beyond in urging the culture of innovating ideas.

iTAC 2023 committee would like to thank all creative participants for showcasing their innovative ideas with us. As expected in any competition, there will be those who win and those who lose. Congratulations to all the award recipients (Diamond, Gold, Silver and Bronze) for their winning entries. Those who did not make the cut this year can always improve and join us again later.

It is hoped that iTAC 2023 has been a worthy platform for all participating innovators who have shown ingenious efforts in their products and ideas. This compilation of extended abstracts published as iTAC 2023 E-Proceedings contains insights into what current researchers, both experienced and novice, find important and relevant in the post-normal times.

Best regards,

iTAC 2023 Committee Special Interest Group, Public Interest Centre of Excellence (SIG PICE) UiTM Kedah Branch Malaysia



# REPLIT: A SIMPLE APPROACH TO REAL-TIME COLLABORATIVE CODING

Adeline Engkamat College of Computing and Informatics, Universiti Teknologi MARA Sarawak Branch adeline@uitm.edu.my

Yii Ming Leong College of Computing and Informatics, Universiti Teknologi MARA Sarawak Branch yiimingleong@uitm.edu.my

Shirley Sinatra Gran College of Computing and Informatics, Universiti Teknologi MARA Sarawak Branch shirley@uitm.edu.my

#### ABSTRACT

The current development of the tertiary education landscape sees the transformation where universities are shifting to a new norm, online and hybrid learning. As such, computer programming courses face challenges in offering interactive teaching and learning in these new environments, as computer programming courses require considerable hands-on coding practice, which is crucial for reinforcing the acquisition of programming concepts and skills. However, traditional online pedagogical tools like video lectures, reading material, and online quizzes fall short of what's needed for effective programming education. To acquire coding skills, it is imperative that students are provided with the opportunity to engage in practical coding exercises and remote collaboration with peers on actual coding tasks. As a result, Replit enters the picture. Replit is a free, browser-based coding platform that allows lecturers and students to collaborate on writing, reviewing, debugging, and sharing real-time coding projects. A study on the usefulness of Replit in learning programming subjects was conducted among Diploma in Computer Science students from Universiti Teknologi MARA Sarawak Branch. The results of the study showed that students have largely praised Replit for its accessibility, interactivity, and ability to facilitate group coding projects. Thus, this further proved that Replit helps to improve engagement between students and lecturers in programming subjects. Using Replit also encourages a collaborative learning environment and increases student participation in programming courses.

Keywords: Collaborative coding, online IDE, computer programming learning, Replit

#### **INTRODUCTION**



The Higher Education Ministry recently introduced a new initiative to incorporate hybrid and flexible learning systems for tertiary programs in Malaysian public universities (Nordin, 2023). This initiative aligns with United Nations' Sustainable Development Goal 4, ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. To ensure a smooth transition from the existing traditional learning system, it is important that public universities are well-prepared for the implementation of hybrid and flexible learning systems.

Traditional online pedagogical tools, such as video lectures, reading material, and online quizzes, are insufficient for effective programming education in hybrid and flexible learning systems. As instructors and students are not in the same physical classroom, conducting hands-on coding laboratory sessions during online classes is also challenging. Students also faced trouble installing and setting up proper Integrated Development Environment (IDE) on students devices as the Operating System may not support the IDE. When students are coding using their IDE on their devices, they cannot receive real-time assistance from lecturers to troubleshoot coding bugs. Students may be stuck at a single lab exercise question for a long time and unable to complete all lab exercises on time. Students are also having problems doing coding group work synchronously. They must download and share the coding files through different platforms such as WhatsApp and email.

Thus, it is seen that students must have the opportunity to engage in practical coding exercises and remote collaboration with peers on actual coding tasks to acquire coding skills. Consequently, real-time learning platforms have become the standard for meeting these requirements and offer a novel way to engage learners with dynamic, interactive content. One such platform is Replit, a cloud-based coding environment that allows users to write and execute code in real time. Replit can also integrate into educational institutions' Learning Management Systems (LMS).

Therefore, this study aims to investigate the usability of Replit as a teaching and learning tool to enhance students' motivation and encourage coding collaboration among students in learning programming subjects. It is also to examine the impact of Replit as a teaching aid on improving students' programming skills.

## LITERATURE REVIEW

Modern education increasingly emphasizes computer programming courses because programming skills are in high demand across many industries. However, because computer programming courses need significant hands-on coding practice, these courses have intrinsic obstacles that can impede successful teaching and learning. Despite various efforts to make



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coding exercises and collaborate remotely with peers on actual coding tasks is essential for acquiring coding skills. Cavus et al. (2006) researched to identify important factors that influence the quality of teaching programming language. The results of this study show that using sophisticated collaborative learning tools for programming enabled students to compile and run the programs they created easily and, at the same time, promoted collaborative learning because students could interact and have discussions utilizing the same platform. Collaborative programming not only can improve understanding and programming skills but also improve high-level thinking skills (Krismadinata et al., 2023).

An online learning platform, Replit has evolved as an advanced real-time collaborative learning tool that offers an integrated development environment (IDE). Rahman et al. (2020) experimented with both interactive and collaborative teaching in teaching an introductory Computer Science (CS) course. They utilized Replit as an interactive learning platform and introduced collaborative learning through a group project. In the study, they also stated that Replit classroom operates on any computer because it is entirely browser-based, making it ideal for BYOD (bring-your-own-device) situations or schools where students utilize a variety of computers. Replit features management tools that facilitate teachers to monitor students' progress and collaborate. The proposed teaching technique boosted student enthusiasm and engagement, facilitate learning, helped students succeed in this course, and lowered failure rates.

A study done by Imbulpitiya et al. (2020) aimed to assess the impact of integrating different active learning tools into an introductory programming module. According to this study, using tools such as Replit helps improve learner motivation, helps students get feedback instantly, and is an interactive and interesting tool. Kodagoda et al. (2021) also utilized a collaborative teaching approach in delivering programming concepts to undergraduates. The study found that most students have selected Replit as the best online coding platform.

## METHODOLOGY

This research investigates users' perceptions of the usefulness of Replit as a real-time collaborative coding platform. The study involved 153 students from the Diploma in Computer Science program in UiTM Sarawak Branch who have experience using Replit to learn various programming languages such as C, C++, JAVA, Scheme, and Python. A survey questionnaire was used to gather data from the respondents. The survey consisted of both closed-ended and open-ended questions. The closed-ended questions were designed to gather demographic information about the respondents. The open-ended questions aimed to collect their experience with Replit and their perceptions of the platform. The survey was conducted online.



## **RESULTS AND DISCUSSION**

In the survey's results, Replit was viewed positively by most of the respondents. Table 1 shows the aspects of Replit that respondents highlight as its usefulness. Items with a substantial number of five frequent responses or more are categorized as listed in Table 1.

	Features liked about Replit			
	Description	Frequency	Percentage (%)	
1.	Ease of Use and Accessibility	103	67.32%	
2.	Collaboration	73	47.71%	
3.	The capability of identifying coding errors	28	18.30%	
4.	Language support	14	9.15%	

 Table 1: Students' Feedback on the Usefulness of Replit

Based on Table 1 above, most of the respondents (103 respondents) were satisfied with Replit's accessibility and ease of use. Replit is accessible through any device with an internet connection. This accessibility eliminates local installation requirements and allows participants to run the coding immediately. In terms of ease of use, respondents stated that Replit has a user-friendly interface. Additionally, respondents said that Replit consists of various features for creating code that could aid them in producing better code. They were also satisfied with Replit's capacity to compile codes quickly and easily and save and retrieve coding work.

73 respondents mentioned that Replit offers collaboration coding features that emphasize the capacity to work on projects simultaneously with others, share code, and receive real-time feedback from the instructor. Code review, mentoring, and remote collaboration are more accessible when Replit projects can be shared. Meanwhile, 28 respondents also mentioned that Replit could quickly identify coding errors, enabling instructors to assist students in fixing the problems together. 14 respondents acknowledge Replit's support for a variety of programming languages. They value how easily accessible these tools are without requiring separate installations. Based on the value it has already demonstrated, Replit can be viewed as efficient in several ways, primarily in terms of time savings and facilitating collaboration.

# CONCLUSION

The results of the study showed that students have largely praised Replit for its accessibility, interactivity, and ability to facilitate group coding projects. Thus, this further proved that Replit helps to improve engagement between students and lecturers in programming subjects. Using Replit also encourages a collaborative learning environment and increases student participation



in programming courses. It is recommended that further investigations be conducted to enhance the teaching and learning experience both for the lecturers and students through project-based coding exercises and greater integration into the learning management system for personalized concepts and skills attainment assessments.

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