RQ1: What are the main success factors and challenges for e-assessment to assess coding?

RQ1.1: What are the common challenges faced by computer science instructors in implementing e-assessment for coding, and how can these challenges be mitigated?
RQ1. 2: What instructional strategies enhance the effectiveness of e-assessment tools for coding in higher education?

RQ2: What factors influence the adoption of e-assessment by computer science instructors in universities?

RQ2.1: What pedagogical and practical factors facilitate the adoption of e-assessment by computer science instructors?
RQ2.2: How do perceived benefits and challenges of e-assessment influence the adoption decisions of computer science instructors?

RQ3: How do the success factors and adoption influences of e-assessment differ between the UK and Saudi Arabian university contexts?

RQ3.1: What cultural and educational differences between the UK and Saudi Arabian university contexts impact the success factors of e-assessment?
RQ3.2: What are the specific barriers to the adoption of e-assessment in computer science education in the UK compared to Saudi Arabia?
RQ3.3: In what ways do the incentives for adopting e-assessment differ between computer science instructors in the UK and Saudi Arabia?

RQ4: What is the impact of adopting e-assessment tools in higher education computer science instructors when assessing coding?

RQ4.1: How does the adoption of e-assessment tools influence the workload and time management of computer science instructors when assessing coding assignments?
RQ4.2: What are the effects of e-assessment tools on the feedback quality provided by computer science instructors to students in coding courses?

Note that : Participant 1 to 8 are from UK and Participant 9 to 15 are from Saudi Arabia.

Participants 1:

“Assessment results quality and reliability ensured through manual checking in programming assignments”

“"Question Mark Perception" system at Southampton University is difficult and unenjoyable to use”

“Setting up exams with the system takes around 4 hours, and the tool is barely used again until the next semester or year.”

“Automated assessments are criticized for promoting surface learning rather than deeper understanding.”

“Automated marking is scalable and efficient, allowing staff to focus on assessments requiring human judgment.”

” E-assessment reduces costs by automating marking and providing instant feedback.”

“ISolutions provides valuable support for setting up and configuring assessments, especially for larger classes.”

“Turnitin is used for plagiarism detection, but no special measures are in place to ensure academic integrity or prevent cheating.”

“The university provides tools to ensure assessments are accessible to all students, regardless of language, technological background, or disabilities.”

“Learning to use e-assessment tools requires training courses, but computer science students are generally tech-savvy.”

“Digital assessment methods are favoured for their scale and engagement over traditional methods like in-class participation.”

“ There are doubts about the effectiveness of computer-aided assessments in measuring deep learning outcomes.”

“ Adoption of e-assessment tools is influenced by colleagues and organizational support.”

“ Training for e-assessment is provided through workshops and practical practices.”

Participant 2:

“ Instructors find it challenging to create comprehensive question sets due to lack of training and time.”

“There are challenges in maintaining academic integrity in coding assessments, including lack of flexibility and accessibility issues.”

“ Automated marking provides scalability and real-time feedback, allowing for efficient handling of large classes

“Moodle is preferred over Blackboard for its flexibility and scalability, aiding in the management of large classes”

Participant 3:

" Setting up the exam for competency assessment can be challenging due to the need for technical proficiency.."

“there is an important of assessment design in ensuring academic integrity, suggesting that the number of assessments and their spacing can help reduce pressure on students to cheat.”

"Technical skills for effective assessment use include basic knowledge of system use and digital literacy."

"Assessment methods should be tailored to learning outcomes and technology, with a focus on continuous improvement."

"Assessment has improved efficiency in submission and access, allowing students to submit work online and lecturers to access assignments and mark them more easily."

"The assessment system allows flexibility for students to take exams from anywhere and for instructors to mark them in different formats, accommodating different learning styles and needs."

"Assessment should be accessible to all students, regardless of technological or language background, and for students with disabilities."

“ongoing support for instructors to effectively use the assessment platform, citing updates, new innovations, and technical changes as reasons for continued support.”

Participant 4:

"Using automated assessment tools to provide immediate feedback to students on their coding skills, with manual marking reserved for more creative tasks that require human evaluation."

"There are challenges with manual marking in large classes, including lack of software for automating the process."

"setting up the exam can be challenging due to the need for technical proficiency."

"The importance of assessing learning outcomes in coding assignments, highlighting the need to check if students can achieve certain functionality and coding style requirements."

"The need to manually set up forms to check if students have achieved certain learning outcomes, but notes that this can be done more efficiently with the right setup."

"Although the university's assessment system is designed to be accessible to all students, certain instructors have encountered substantial accessibility challenges, particularly in the effective use of e-assessment tools."

"The challenges of scaling up the assessment for a large class, including the need for consistency in marking and the number of demonstrators required."

"Using computer-aided assessment has saved time for both instructors and their students, reducing the time it takes to set up and mark exams from weeks to days."

"The assessment provides immediate feedback to students, which they appreciate and find helpful in improving their work."

"I overcome these challenges by setting up a Microsoft form with template answers to ensure consistency in marking, but still faces the issue of having enough demonstrators for the coursework."

"E assessment in programming courses focuses on evaluating students' problem-solving skills through open-ended questions, rather than multiple choice questions."

Instructors find it challenging to create comprehensive question sets due to lack of training and time."

Participant 5:

"Academics often create bespoke assessment tools for their modules, which can be problematic when the academic leaves or moves on."

“Sometimes, students receive incorrect feedback with no explanation, hindering learning outcomes”

"There is a concern about the inflexibility of automated assessment systems, which may penalize students for minor variations in coding style or language."

"humans can read between the lines and understand why a student has done something a certain way, but it would be difficult to design an assessment system that can do the same."

" the limitations of these tools, such as the need for manual assessors to evaluate subjective criteria."

"Assessment methods may not effectively support learning objectives, leading to superficial knowledge."

" the benefits of using automated assessment tools, including increased efficiency and flexibility in accommodating different learning styles and needs."

“automated assessment systems can improve scalability in large classes, but may also reduce the accuracy of feedback for students."

"Automated assessment tools can help moderate subjective coding assessments, but are only effective for certain types of assessments."

"Instructors want assessment tools to save time and effort while providing constructive feedback to students."

"Using a consistent system for marking and feedback, with simplicity and consistency being key for students."

" 'Hand in' system as a solution, which provides a simple and consistent interface for students to submit their work."

"E assessment can save academics time by reducing marking effort, allowing them to focus on improving other skills."

"University academics ensure quality and reliability of assessment results through moderation and proofreading, despite infrastructure challenges."

"I suggest that instructors may need ongoing support to effectively use assessment systems, while believe that individual module leaders are responsible for providing support."

" speed of feedback is important, particularly with large numbers of students, and notes that Southampton struggles with this issue."

"automated assessment systems may limit the ability of academics to understand student weaknesses and adapt teaching skills."

" the limitations of automated assessment tools, including the potential for personalized feedback and the need for continuous revision to adapt to changing student needs."

"the importance of using assessment tools to provide valuable insights for academics, beyond just marks and feedback to students."

Participant 6:

"Auto-marking only works for advanced programming module, while introductory module requires manual marking due to large class size."

"Southampton University uses Blackboard and Questionmark for assessment, with limited flexibility."

“Automated tools can provide feedback quickly, but they often lack the nuance needed to address individual student needs. Personalized feedback is critical for helping students improve their coding skills”

"Academics struggle with setting up questions on online assessment platforms due to large class sizes and limited time."

"There is challenges in scaling E assessment, lack of technical skills”

"E-assessment offers time-saving benefits but may lead to reduced student writing quality."

"the automated assessment tool is mainly used on Blackboard, with some customization done by themselves."

"Ensuring academic integrity in online assessments requires invigilation and special platforms like Blackboard."

E-assessment supports scalability in large classes"

"using E assessment for easier marking, particularly for large classes with multiple choice questions."

" the potential benefits of using automated assessment tools, such as saving time and effort, and exploring the impact on students' learning outcomes."

Participant 7:

“we are using a tool from three years that for an exam for multiple choice questions, we are using the Blackboard exam."

“there are settings that provide feedback when a student has selected the wrong answer to the question."

" The tools that I have learned are easy, but sometimes it takes time to learn. You have to practice; you have to find the pathways to the correct setting. And that makes it very time-consuming.

“Blackboard, Once it is set up, the students can do it. And we save many steps in organizing it in everything we're implementing it"

“using Blackboard for assessment increases performance, allowing for efficient grading of multiple students”

“I desire to use assessment tools, but lacks training and practical experience”

“automated feedback in education has benefits (consistency, unified responses) and drawbacks (lack of personalization, nuance)”

“trusts their own assessment tools and has used them for three exams, but is only slightly familiar with other assessment tools.”

“Assessment aligned with learning outcomes can help enhance coding skills”

Participant 8:

"I acknowledge familiarity with assessment tools but lacks specific knowledge of new packages and technologies."

"I emphasize the importance of assessing code quality beyond just aesthetics, to ensure students feel respected and confident in their work."

"Assessment alone is not adequate for student feedback, must be part of a hybrid strategy."

"Instructors face challenges in assessing coding automatically, with some using multiple-choice questions in Blackboard."

"Instructor seeks ways to streamline assessment process for 300 students, despite lack of tools and training."

"I emphasize authenticity, student satisfaction, and rigour in assessment."

" assessment's impact on teaching and performance, I find it helpful in preparing assignments but also more effective in reducing extra effort."

"There are challenges in providing equal access to high-performance e-assessment resources for instructors, including issues with infrastructure, equipment, and support."

"Automated feedback supports pedagogical goals if designed carefully to support learning outcomes."

" providing personalized feedback in coding skills development is very important."

Participant 9:

" iSolutions change their VMs every year, which means the operating system changes, stuff breaks, and it wastes my time as an academic fixing it, it would be appealed to being a lot better if they've been a lot more stable."

"The VMs themselves that isolation to provide are tiny, and they do not have a GPU card".

"I had to talk to the person who set that up. But that is not university training, that is just talking to an expert in iSolutions. I then did it all myself"

Participant 10:

"I have experience with using Blackboard and different tools for assessing coding tasks, and expressed hope for finding a tool that can make the process easier in large classes."

“Blackboard to assess coding assignments, needs more flexible assessment tools to provide high quality feedback."

“ there are many challenges with assessing coding skills in large classes” ,

“ I believe using e-assessment tool can help increase performance"

“E-assessment tools may not accurately assess creative student solutions “

“there is a need for tools that are easy to access and use by instructors”.

Participant 11:

“e-assessment can facilitate identification and improve the overall assessment process."

" there is a difficulty of manual code assessment and there is a need of automated assessment to increase productivity and improve quality."

"Main challenge in assessing code is length, takes too much time."

"we need to explore tools to continue providing e-assessment environment for students, even for subjects not aligned on campus facilities"

“Challenges include the length of code assessments taking too much time, assessing codes in non-aligned subjects, and assessing coding skills without using full code in exams.”

"I consider asking questions that require students to write full programs instead of filling blanks, which could be better assessed using e-assessment tools."

"I suggest exploring options to continue providing an electronic assessment environment for instructors, even for subjects not aligned on campus."

Participant 12:

"I use Blackboard for multiple choice questions"

"I use Blackboard for assessment, with limitations on feedback."

"there are challenges with using Blackboard for assessments in computer science, including time consumption and limited feedback capabilities."

"there are challenges with assessing students' code assignments, including time consumption and difficulty correcting students' writing for all code statements."

"there is a lack of automatic grading and feedback features in blackboard”

" The tool reduced my workload but I found myself supplementing it with manual feedback to ensure students received the guidance they needed."

“AI tools could improve the assessment process and provide more effective feedback to students."

“Blackboard is used for multiple-choice questions and open-ended coding assessments, but it has limitations on feedback.”

“Challenges include time consumption, difficulty correcting students' writing, lack of automatic grading, and students receiving incorrect feedback without explanation.”

“While the tool offers efficiency, I still need to add manual feedback to make sure students get the specific guidance they require”

Participant 13:

“automated tools could evaluate students' code based on specific requirements and output expectations, saving time and improving accuracy."

“limitations of current assessment tools in detecting errors in code logic and lack of specific requirements for assessing code."

"there is a challenge of assessing students' code in programming courses, including time-consuming manual feedback"

" I face challenge with using a specific compiler during code assessment."

"Teacher struggles with time constraints due to grading coding assignments, impacting ability to provide students with additional activities."

“I believe that e-assessment tools doesn't fully assess learning outcomes”

"computer science instructors need better assessment tools in programming subjects to evaluate student code more accurately."

“Current assessment tools have limitations in detecting code logic errors and lack specific requirements for assessing code. Manual feedback is time-consuming, and using general compilers poses challenges in code assessment.”

"Explore developing an assessment tool that can check for required methods and output against expectations."

"I provide feedback to students via email about their code submissions."

Participant 14:

"I use Blackboard interface”

"manual assessment for coding assignments is a significant challenge”

“e-assessment tools can improve the quality of coding assessments."

"the most important challenge of assessing programming assignments is that, I cannot identify creative variations among students."

" the process of manually assessing student assignments, including downloading, assessing, and providing written feedback, all that let us spend lots of time and effort unlike e-assessment."

"the potential benefits of using assessment tools are including time savings and improved quality of coding."

"I suggest improving the assessment interface for easier file upload and prompt-based generation."

"I believe assessment supports pedagogical goals indirectly by saving time for improved learning materials."

"I believe e-assessment supports pedagogical goals indirectly by saving time for improved learning materials."

“Blackboard interfaces are found to be easy to use by both the instructor and students.”

“Challenges include manual assessment being time-consuming, difficulty in assessing creative variations in student assignments, and the process of manually downloading, assessing, and providing feedback.”

“Marking on papers is error-prone and time-consuming, but the new assessment platform can streamline the process.”

"I suggest for future assessment tools to have straightforward interfaces for uploading/downloading files similar to chatbots."

"I consider potential of automated assessment tools to save time and maintain consistency in grading."

Participant 15:

"using an e-assessment tool can make it easier to assess code, as it automates the process of finding errors and bugs."

"Assessing code in computer science courses, using e-assessment tool."

“In our context, personalized feedback is not just a pedagogical tool but also a cultural expectation. Students expect detailed, individualized feedback, which automated tools sometimes fail to deliver”

"I face time constraints when assessing code assignments individually for 70 or 60 students."

"I am interested in using E assessment for coding assignments, and trust it to provide accurate feedback."

” this type of assessment can enhance the quality of coding assessment, as it allows for more efficient and accurate evaluation."

"I suggest that using AI-powered tools to assess code, citing personalized learning and adaptive assessment as key benefits."

"I suggest using an E-assessment tool to help students achieve learning outcomes."

“Challenges include time constraints when individually assessing code assignments for large classes and the potential challenges of e-assessment despite its benefits.”

“E-assessment tools are believed to enhance the quality of coding assessment by allowing for more efficient and accurate evaluation.”

“E-assessment tools are suggested to help students achieve learning outcomes, and modifying assessment methods to better support pedagogical goals and learning outcomes is recommended.”

"Explore available e-assessment tools to automate debugging and reduce time spent on assignments."