The Impact of Flexible Assessment on Students' Engagement and Learning During COVID-19 Pandemic

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ARTICLE INFO	ABSTRACT
	The work presented in this paper is related to the use of the flexible assessment to promote collaborative learning that impact students' engagement and learning, especially during COVID-19 pandemic. This paper presents the analysis and results obtained by applying the flexible assessment in a large second-year undergraduate computer science module. Flexibility in assessment is usually achieved by giving students choice over the assessment components, contents, type, weight, timing, or the overall assessment grade. This study, however, demonstrates the development of a flexible assessment where students were given the choice to invest in a flexible assignment task designed to encourage collaborative learning and the development of higher-order thinking skills. The flexible assessment used in this study has proven that effective learning can occur when students work collaboratively. The data used for the analysis are those collected from a questionnaire distributed to students by the end of the academic term in addition to gathering students' written feedback comments about their experience of the new flexible assessment. The questionnaire results and students' feedback related to their learning experience are recorded and examined. Students' performance of the targeted module has been recorded, interpreted, and contrasted with similar assessment of another module that has no flexibility in its requirements. In accordance with the students' performance, questionnaire and feedback analysis results, flexible assessment is considered a unique assessment, beneficial and useful for students' learning and engagement.

1. Introduction

This paper concerns the implementation of the flexible assessment of a second-year undergraduate computer science module. The students are made aware of the new form of assessment at the early stage of the term. This is followed by a presentation delivered by the module lecturer to exemplify the motivation, meaning, and contents of the flexible assessment. Afterwards, students were given the opportunity to read the assignment brief and raise questions in the following week live session.

The data collected for this research are related to 207 students' feedback and students' performance in the module. An anonymous questionnaire administered by the end of the

academic term and students' detailed feedback written comments are gathered for analysis. The questionnaire consisted of 10 questions probed students' views on the assessment format and the learning experience.

The initial findings show promising results that include enhanced students' engagement, maintained excellent performance against fixed assessment criteria and improved learning, communication, presentation, and research skills.

Student evaluations confirmed that using this type of assessment was beneficial and contributed to a significantly improved learning experience. The study demonstrates and evaluates the effectiveness of flexible assessment as an assessment for collaborative learning.

This work differs from previous work in aspects such as the module subject area; to our knowledge, the flexible assessment has been used and analysed in mathematics, accounting, physics, and other science subjects (Mavridis et al, 2017), (Parunchana et al, 2013),(Wieman, et al, 2014) but little/not used or comprehensively analysed for specific technical modules such as those in computer science. The flexibility of assessment includes providing choices on contents, components, grouping, timing, style, tools, weighting, marking and feedback.

In this work, the provided flexibility options have been carefully chosen to address some aspects related to students' engagement and learning and to stimulate students' high order thinking skills such as creativity. In addition to that the contents of the assessment represent one of the key hot topics that are of interest to all students.

The results of the analysed data demonstrate how the assessment could expand students' knowledge of the selected research topics. Furthermore, the developed communication, research, and presentation skills provide concrete evidence of the successfulness of the assessment, which is further complemented by excellent students' performance.

The promising results concerning students learning experience, engagement, and excellent performance, are the key success factors that are analysed and presented in this paper.

2. Related Research

Flexible learning, including flexible delivery, when students are voting on how to study, when, and where they want. Higher Education Academy (HEA) in their framework of flexible learning describes flexibility of learning as a tool to empower students. There is a debate about personalising learning via flexible delivery requires more flexibility or personalising of assessment. The assessment is the main motivator for student learning, that needs to be constructively aligned with all other learning activities to ensure a cohesive learning activity (Biggs, 2003). Therefore, flexible assessment is important as a flexible delivery.

Flexible assessment is offering students options of assessment that may better suit their learning styles & personalities. A popular example was identified in the literature as having issues based on assessment, which is Mathematics learning at University level. Many issues in learning mathematics relate to students' feelings and perceptions. For example, those issues related to students' feelings about Math assessment and students rate low for Math Lecturers. Research shows that when flexible assessment comes into practice, some of these issues are resolved. (Wood et al ,1999) in their work examined three assessment parameters these are, assessment type, assessment timing, and assessment weight. By providing flexibility on the summative assessment tasks, students could select from various types of assessment components. The lecturers provided students with a choice of 1, 2, or 3 assignments worth 20% each and an examination with 4 questions worth 20% each. Students could do 3 assignments and 2 examination questions, 2 assignments and 3 examination questions or 1 assignment and 4 examination questions.

(Wanner et al, 2015) shown from other studies that many students express a strong preference for choices in the type, components, contents, weighting, and timing of assessment tasks. Students request to be actively involved in deciding on the away they prefer to be assessed to shed light on their particular skills. They believe that flexibility in assessment timing will help manage their time efficiently and study more effectively. This would help students own their learning and become independent learners. Therefore, providing flexible assessment in a carefully structured way is worth considering in higher education courses.

In another study (Candice et al, 2018), the authors considered a large cohort of students who can either use the marking scheme provided by the lecturer or to modify the proposed-grade distribution by selecting the values they would prefer. The assessment components are (mini-assignments, quizzes based on reading, hot topics discussion session, assignment, mid-term exam, and final exam). The results indicated that 62% of students have made changes on the grade distribution, which indicates that there is a strong motive among students for personalizing their learning and how to be assessed. Furthermore, the regression analysis showed that mid-term exam performance is a good indicator of the final examination performance. The provided flexibility helped personalising students' learning experiences in the context of large enrolment undergraduate courses.

A study by (Cook, 2001) used flexible assessment in a large introductory economics class. Final grades were calculated using four options and the option with the highest grade will be considered the final mark of the module. Analysis of students' performance indicated that the maximum grades of most students resulted from including multiple assessments. However, a group of students did incomplete their assessment before the final examination and only few of them passed the module.

Another work by (Pretorius et al, 2017), suggests the use of two compulsory assessment (exam and coursework) and 2 optional assessments (pre-lecture quiz questions, critical thinking questions) to develop students' critical thinking skills. Students either take the compulsory assessments or all the four assessment components. The analysis of data gathered from survey and interviews indicated that students taken the optional assessment components have developed their critical thinking skills.

(Pacharan et al, 2013) examined the use of flexible assessment to encourage students' participation in the learning process. The results indicate improvement in students' engagement with the learning tasks, and the grades when flexibility of selecting assessment weighting is introduced. The authors stress on the developed self-regulated learning skills that allow students to practice their learning and develop a deep understanding of the module.

As demonstrated in the above, most of the work on flexible assessment in Higher Education work presented in the literature is considering flexibility in assessment weight, timing, components, and less work on flexible assessment that addresses flexibility on content, style, methods and tools that all addressed in the work presented in this paper.

3. Flexible Assessment Design

The method for designing flexible assessment follows making changes on the existing assessment. It is crucial to consider what and how do we want our students to learn and how will be assessed. The planning of the new assessment requires careful consideration of the intended learning outcomes, the other assessment components, and the students' perception of the new form of assessment.

The selected module for this study is level-5 large module delivered over 11 weeks in an online learning model because of the COVID-19 pandemic. The module designed in a form of flipped

classroom that includes providing recorded videos, readings, exercises followed by weekly 1-hour online session.

Table-1 shows the assessment components of the previous academic year and the proposed new assessment patterns of the current academic year.

Table 1.
Assessment Patterns

2019-2020		2020-2021	
Weekly Quizzes	15%	Weekly Quizzes	10%
_	_	Mid-term exam	30%
_	_	Group assignment	20%
Final Examination	85%	Final Examination	40%
Total	100%	Total	100%

Including continuous assessment ensures that students will be fairly and consistently assessed in this unique situation. Following Biggs's concepts of constructive alignment of intended learning outcomes and assessment tasks (Biggs,2003) and other authors such as (Lie, 2002) and (Race, 2005) with opinion that students learn a massive amount from each other if they have been given time, place and opportunity to do so. In this module, group assignment is introduced and it contributes 20% of the overall module mark. Group assessment encourages discussions among students and knowledge testing. Moreover, it is constructively aligned with the intended learning outcomes of the module. In addition to the group work, there will be the weekly quizzes, mid-term exam and the final examination. The weekly quizzes are online quizzes address all the learning outcomes of the module and students have 3-attempts on each quiz. These quizzes are another form of flexible assessment where students can attempt 7 of 9 quizzes. This is a form of assessment "for learning" not "of learning" and it contributes 10% of the total mark of the module. Overall, the flexible assessment in this module contributes to 30% of the module final mark. The mid-term and final exams contribute 70% of the final mark and these are rigid 1-hour traditional online exams that address all the learning outcomes of the module.

Table-2 depicts the assessment parameters that determine the amount of flexibility. As shown, the parameters highlighted in bold are considered in the design of the flexible assessment implemented in this work.

Table 2.
Flexible Assessment Parameters

Flexible Assessment Parameters	Y/N
Components	N
Contents	**Y**
Grouping	**Y**
Timing	Y
Weighting	N
Marking	N
Feedback	N
Style	**Y**
Tools	**Y**

The flexibility in components refers to the possibility of providing various/same types of assessment that students can choose from. In this work, students are encouraged to take all the weekly quizzes but also given the opportunity to choose 7 of 9 quizzes to attempt. The flexibility of the assessment contents refers to give students the opportunity to select the contents of the preferred to learn. In this work, the choice of the research topics is provided to students. It is recommended to involve students in group assignment to develop their team

working skills. Throughout this work, as will be shown later, it is indicated that providing flexibility on group selection made an excellent impact on students' learning experience. Students may be able to negotiate the timing of submission of assignments within a term or over a longer period. Additionally, students may be given complete freedom to decide on the weight of various components between 0% and 100% and students also can be given a choice of who marks their work, their peers, self-marking, lecturer or a mixture of these modes. More choices can be given for assessment feedback such as providing written solutions, comments sent by email, or a 10-minute verbal feedback provided by the lecturer.

Furthermore, students may be able to choose the style or format of their assessment. They may be able to write a report, develop a program, produce a video, design an animation or construct a poster presentation. Students are free to choose which tools they can use to complete an assessment task. This can include computer tools such as PowerPoint, MS Teams, or other tools such as animation tools or statistical tools.

Students made aware of the assessment components in advance and further details provided in week-1 live session. In week-5 live session, the lecturer provided a presentation about the importance of flexible assessment in students' learning and engagement. The assignment brief is issued to students after the session. Students had to decide and submit a form by week-7 to inform the lecturer of their choice of the research topic and the group members, otherwise they were assigned randomly to groups. This is considered by students as valuable feature of this unique assignment as they felt that they were being consulted and given some say in their learning and take control of their own learning. It also made them more comfortable with their choice of group mates, which mainly contributed to the success of group work.

 The basic concepts of information security are covered in the module and to expand students' knowledge further research is required as addressed in task-1 of the assignment depicted in Table-3. Students given few themes of research in advance to guide them researching Information Security, which is a very wide area of research. They have been asked to select a specific research topic themselves. The flexibility of topic selection can be stressful given that the breadth and depth of the research area. However, this approach to flexible assessment (in which few examples of a specific research topics are also provided to students), appears to have met the needs and research preferences of diverse learners in this large cohort

Table 3.
The assignment tasks and marks distribution

Tasks	Description	Mark
Task-1 Topic Selection/ Research excellence	-Examine whether the selected topic is one of the hot topics and there is evidence of extensive research has been made.	30%
Task-2 Implementation	-Examine the quality of the product (video, PowerPoint, poster, animation)	25%
Task-3 Presentation Creativity	-Examine students' creativity skills.	20%
Task-4 Quality of Report	-Examine quality of analysis and reflection.	15%
Overall		100%

In the second task, students are free to select which tool to use to implement their task. They are free to select which method to present their findings. It could be a form of 10- minutes recorded video, 3-5 slides narrated PowerPoint presentation, or they can develop animation, or a poster presentation. Task-3 is a key task that is open-ended that stimulate students' higher level thinking skills. Students should think of non-traditional method of presentation, and they need to be creative. The documentation part of the assignment is a report that should include

any further information to expand on the presented information in the product and there is a section for reflections.

The challenges that one thinks of are captured in Table-4 and a mitigation of each challenge is given during the planning stage.

Table 4.
Challenges and mitigations

Challenges	Mitigation
Too much Choice	Too much choice at the early stage of their studies can be difficult to communicate. Large classes are the norm of Year-2 students taking a core module and it is an issue to discuss and negotiate in such large class, however, with careful planning and organization the lecturer managed to communicate number of choices with students.
Wrong topic Selection	Students share their selected topics with the lecturing team before the deadline for discussion and approval.
Admin work	Anticipated issues with topics selection and groups allocation. Therefore, Teaching Assistant support was requested.
Consistent marking	Given that students will submit the assignment in different formats, and this could raise an issue of inconsistent marking across students. Therefore, it was planned to subdivide the marking load on three of staff members and the marking was carried out per product type to ensure consistency of marking and second marking.

4. Students' Engagement with Assessment

The Higher Education literature defines the following concepts of students' engagement with assessments (Bae et al,2016):

− *Relevance*: The concept of relevance refers to the process by which a student perceives that a task will satisfy important personal needs, motives, or values (Keller, 1983). In this sense, this has been achieved by allowing students to choose from a range of topics in Information Security and related themes, which is of high interest to most of the students. Relevance is fostered by making a connection to students' lived experiences, and interests, or prior knowledge as will be shown later in the data analysis and results discussion.

− *Authenticity*: The concept of authenticity refers to the extent to which a task requires students to solve real-world problems and has value beyond school (Lombardi, 2007). This is made explicit to students in the assignment brief as a key requirement to pass the assignment is to research a real-world problem given that information security problems are one of the major real-world problems.

− *Autonomy:* The concept of autonomy derives from self-determination theory and refers to the extent to which a student can choose or self-initiate action, or experience an action, for which the student is responsible (Deci & Ryan, 1987). Assessment autonomy is of high degree as students must select from different research topics, they have choice on their team mates, they can select methods of implementation and have a choice on the tools to implement their assignments.

− *Collaboration:* Collaboration has greatly increased student engagement (D. Johnson & R. Johnson, 1987; Slavin, 1990). Collaboration in the group setting develop team-working skills and enhance students' learning experience.

− *Higher order thinking skills:* As defined by Bloom's taxonomy of learning (Krathwohl,2002), higher-order thinking skills refer to the analysis, evaluation, and creativity skills. The analysis and evaluation skills are examined in Task-1 given that students should gather and analyse information and at the final stage of their research, evaluation of findings is a must. Students' creativity skills are examined in the presentation of the product.

Table 5.
The features of Engagement Concepts identified by students

Engagement concept	Features identified by students
Relevance	− Some students have prior experience of Information security. − High interest in Information Security
Authenticity	− Most groups researched real-world scenarios − Authentic purpose
Autonomy	− Topics selection based on students' interests − Open-endedness of research topic, method of implementation, tools selection. − Implementation methods choices made according to students' ability level or desire for challenge
Collaboration	− Getting help from group mates. − Making sense of the group work experience. − Socialization during the lockdown.
High order thinking skills	− Stimulate Creativity. − Tasks that are challenging but doable. − Multiple presentations, tools, styles.

5. Data Analysis and Discussion of Findings

The analysis reported here is a combination of quantitative and qualitative analysis of data collected from second-year computer science students to examine the learning experience of students obtained after conducting the flexible assessment. This section concerns with the analysis gathered data from students and their academic performance. The total number of students voluntarily taken part in this research are 207 students, 151 participated in the anonymous questionnaire and another 56 students provided detailed comments. As shown in Figure-1 most students in this cohort are highly performing students which is also reflected in the sample that participated in the questionnaire by answering the question:

> *"How's your performance during the Pandemic such as in which classification is your average grade of the first term or previous year?"*

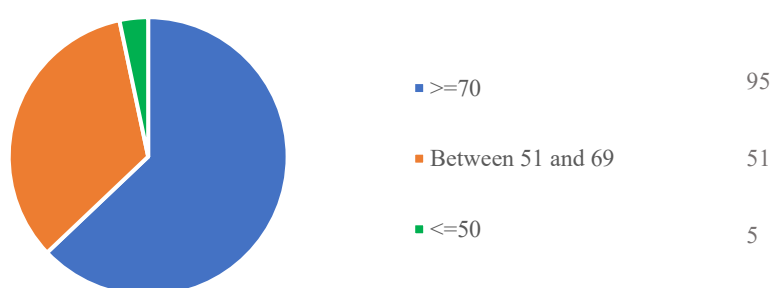|	
■ >=70	95
■ Between 51 and 69	51
■ <=50	5

Figure 1. Students' Overall Performance in Previous Term/Year

Students' developed skills are further explored in Figure-2. As shown, the majority of students (82) reported that they developed all the skills (communication, presentation, research) and subset of students developed individual skills. Notably, another subset of students (17) does not believe that they developed any of these skills.
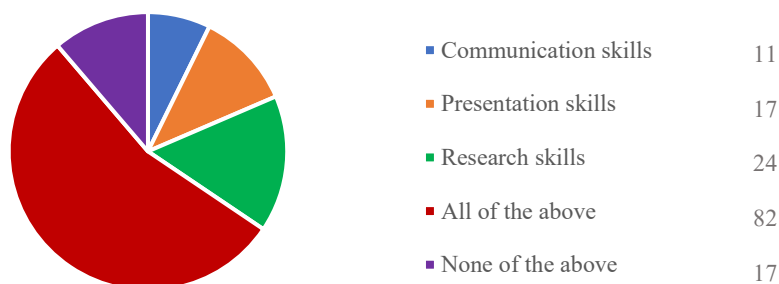
■ Communication skills	11
■ Presentation skills	17
■ Research skills	24
■ All of the above	82
■ None of the above	17

Figure 2. Students' Feedback on developed skills

Questionnaire statements/Questions are classified into those related to students' learning experience and the other category is related to students' engagement with the flexible assignment as shown in Table-6.

Table 6.
Feedback Results

Learning Experience		
Statements	Response (N=151)	
Do you have previous experience about the selected topic of your group assignment?	Yes 18% (27)	No 82% (124)
Do you think this assignment expanded your knowledge in the selected topic?	Yes 85% (129)	No 15% (22)
Does the flexible assignment developed your skills?	Yes 88% (134)	No 11% (17)
How do you rate your group harmony during meetings, email communication, allocated responsibilities?	High 96% (144)	Low 4% (6)
Students' Engagement		
Statements	Response (N=151)	
Do you prefer/enjoy flexible assessment?	Yes 84% (127)	No 16% (24)
Do you think that you will perform better if this assignment is individual work?	Yes 21% (32)	No 79% (119)
Did you select group mates?	Yes 81% (123)	No 19% (28)
Do all group members contributed in developing the final product and/or the report?	Yes 87% (132)	No 13% (19)

The 56 participants provided detailed comments in addition to the comments provided in the "additional comments" section of the questionnaire total is (7541 words). These comments are analysed using iterative coding to allow common themes to emerge from the collected data. Therefore, comments are classified according to the following themes: Assessment Format (AF), which refers to students' engagement with the assignment, Collaborative Learning (CL) captures the developed skills in the group setting, Personalised Learning (PL) addresses students' strengths, needs and interests, and Lifelong Learning (LL) which mainly focuses on effective learning for continuous professional development required for future employment. Feedback codes, description, the count of occurrences, positive and negative comments are summarised in Table-7.
A general look at the students' feedback shows that a vast majority of their comments (92%) are positive (expressed in 207 positive comments) whereas only 8% expressed the negative opinion in 18 negative comments. These results demonstrate students' high engagement with this format of assessment expressed in 69 comments on the assessment format. Positive (25)

comments related to collaborative learning and the group work experience. The highest positive comments (96) related to personalized learning underline the motive of using flexible assessment for learning. The lifelong learning skills also have some emphasis in students' feedback.

Table 7.
Coding system and results as applied to students' written comments regarding their experience of flexible assessment

Comment	Code	Description of Code	Count of Occurrences
Positive Total= 207	AF	**Assessment Format:** enjoyment, fun, beneficial, interesting, novel, insightful, free from stress & pressure, boost productivity, a nice change of pace from the usual mundane coursework, mitigate negative impact of the pandemic.	69
	CL	**Collaborative Learning:** discuss with others, know other approaches and opinions, comparing with others, reduce knowledge gap, develop ideas collectively, collaborate to answer, improve team working & collaboration skills, socialise with other students,	25
	PL	**Personalised Learning:** Foster research skills, dive into real-world scenarios, make decisions based on students' capabilities, stimulate rich thinking and genuine interest to learn, empowered to make our own choices, explore our interest fields.	96
	LL	**Lifelong Learning**: develop skills required for industry, Good preparation for year-3 project, develop research skills & self-learning, develop independent learning, develop skills that are beneficial in their future endeavors.	17
Negative Total= 18	NEC	**Negative Comments**: no programming task, restrictions on video length/number of references, uncertainties at the beginning, overlap in presentation formats, not providing examples of creative work.	18

Below are samples of students' comments addressing the categories identified in the feedback-coding categories:

> *"This was my favourite coursework in my two years at the University. Through the flexible assignment my group members and I got to research a topic we are genuinely interested in, we also improved our research skills, communication skills and presentation skills, all are very important and useful in any future careers and jobs we'll have."*

> *"With the addition of LinkedIn learning provided by the University for all students, members of the team were considering refining their knowledge of these specific technologies as a pure passion project."*

> *"We feel that this form of flexible and inclusive assessment brought our maximum creativity out of all of us, and we could function remarkably well as a group, while also immersing ourselves in the chosen research topic "*

> *"Research skills are invaluable to have as a student and developing them further through this assignment will help us immensely in our future academic endeavours and studies in general."*

> *"Students will develop practical skills such as research and presentation which would be extremely beneficial in their future endeavours"*

Students found this specific assignment unique for two main reasons, first is the provided flexibility and its impact on students' learning experiences and engagement during the pandemic. The second reason is more related to the creativity aspect of the assignment.

Having flexibility in group selection has a great impact on groups harmony and reducing the issues that may come up with random allocation. The groups performed extremely well and the student developed their team working skills. It is nice to note that individual responses to the questionnaire start with "We" or the "group". This indicated how much the students are immersed in this group activity.

> *"Group members choose their own learning direction according to their interests and desire for challenge".*

> *"Given the current situation of the pandemic, flexible assessment gave us an opportunity to collaborate with course-mates easily and more effectively."*

> *"We collectively appreciated the flexibility given by this unorthodox assignment."*

> *"We already have many smart computer scientists, what we need are creative and outspoken ones, ones that assignments like this can produce. "*

A closer look into students' comments indicated that this form of flexibility helped students' especially during the pandemic. It is an opportunity to less performing students to meet high performing students to enhance their learning experience. Samples of feedback comments reflecting this point are shown below.

> *"The type of assessment helped mitigate the negative impacts of the pandemic"*

> *"We really like this step because we get to know each other and we can socialise with other students who may help us in the future."*

Students were excited about the "Creativity" aspect of the assignment, but some of them yet worried about "What does being creative mean exactly? ". Providing students with examples of creative work would be beneficial. However, the lecturing team decided to stimulate the students' high order thinking skills via discussion on creativity. At the end, students demonstrated various types of creative presentations such as News like presentations, TV reports, using avatars, using animations, interview with expert format and skits.

> *"The fact that creativity and content were important parts of this coursework felt like a breath of fresh air in contrast to the monotone pervasive in other coursework. The research carried out opened our eyes to knowledge hitherto unknown to us and seeing how cyber security closely relates with this module was very interesting. "*

Another aspect that has been clearly addressed in students' feedback is lifelong learning skills and in particular those related to their future employment. It helps students discover their interest in the computer security field, also plays an important role in guiding the direction of future employment as shown in the comments below:

> *"Beyond the presentation, we all feel this form of assessment equipped us with a unique set of skills that will be useful to us in employment when we need to convey technical information to a wider audience."*

> *"The team appreciated the opportunity to work on such a malleable assignment. The task was an invigorating one for many reasons: "This assignment fostered our interest in the growing industry of 'AI in cybersecurity', which has led to some of us considering a career in this area."*

The negative comments were mainly related to lack of experience in this assessment format and not providing examples of creative work. Not providing examples is purposely planned to stimulate students' creativity rather than copying existing ideas.

> *"People learn a lot of what they know through mirror neurons, so harnessing this natural learning process would be advantageous."*

There were few comments related to not providing a programming task as part of the assignment requirements which we believe this is a valid point to consider in future implementation.

Students' academic performance in the module is captured in Figure-3. The descriptive analysis of the marks is captured in Table-8.
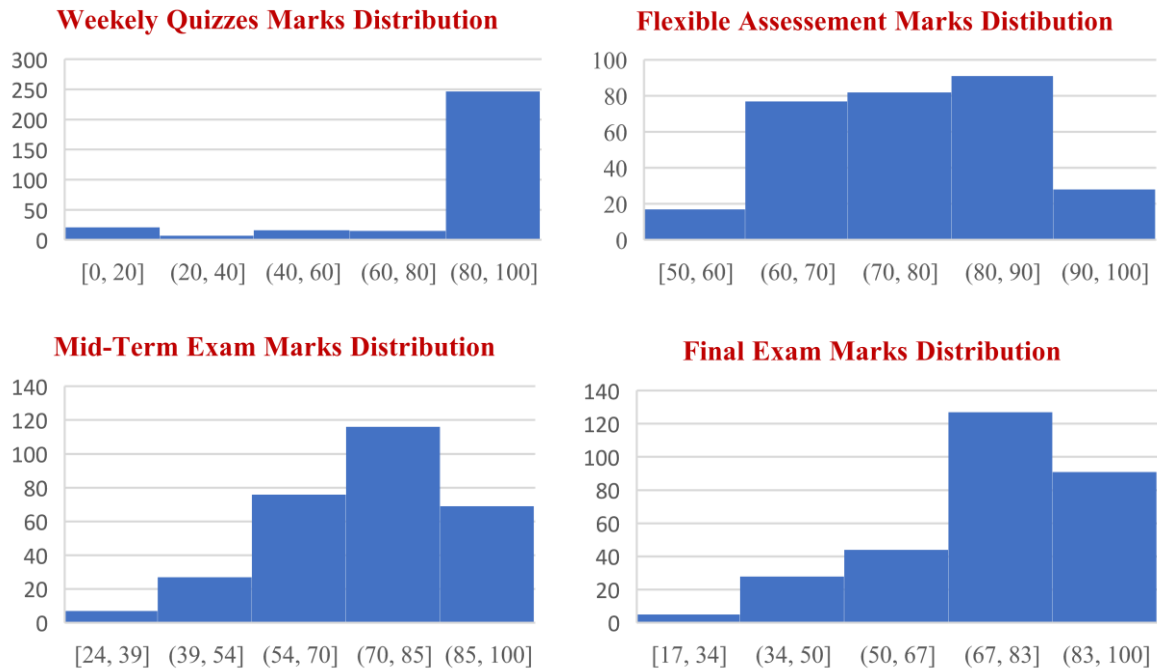

Figure 3. Students' academic performance in the module

Table 8.
Descriptive Analysis of the module assessments

Measure	Weekly quizzes	Group Work	Mid-term Examination	Final examination
Mean	85.80	76.11	72.70	73.75
Standard Deviation	27.60	10.67	15.61	15.81

Students' performance of the group work and weekly quizzes is higher than the mid-term and final examinations. The majority of students scored high marks in the group work and no student failed the assessment. The statistical analysis revealed a strong association between mid-term exam and final examination. Therefore, mid-term exam can be used as a good predictor of the students' performance in the final exams.

A comparison between students' performance of the flexible group assignment and similar group assignment that students undertaken in the same academic year but with no flexibility are depicted in the histogram and the Kernel Density Estimator (KDE) shown in Figure-4.
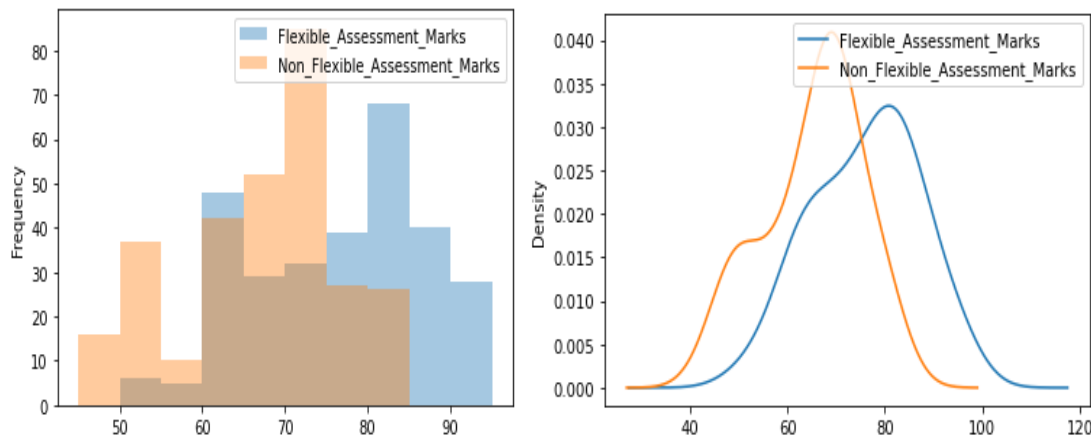
Figure 4. Histogram and KDE of the flexible assessment marks and non-flexible assessment marks.

As indicated in the histogram of marks, students' performance is increased when they are empowered by flexibility of assessment such as those used in this work, as explained earlier, there is a flexibility of groups allocation, topics selection, format, and tools that can be used to implement the tasks.

A final note on students' personal and professional development. As flexible assessment encouraged students to actively participate in their learning, students felt proud of their work and some of them trying to use it in future events and competitions. At the time of this publication, one group submitted their group work to Adobe Digital Edge Award. This is another evidence of how students' perceptions about assessment have developed when they utilise their work in events that enhance their employability skills.

6. Conclusions

This paper presents the design and implementation of the flexible assessment in the second-year undergraduate computer science module. The aim of conducting flexible assessment was to engage students with assessment, promote collaborative learning, develop their high-order thinking skills such as critical analysis and creativity and maintain good academic performance. Students' engagement and learning experiences were evaluated through students' feedback gathered via anonymised questionnaire (N=151) and further detailed comments gathered from 56 students. In additional to that, students' academic performance of the various assessment components is captured and interpreted. The overall results appear to be promising. The vast majority of the participating students felt that the flexible assessment is enjoying, useful, interesting, promoting collaborative learning, and develop their employability skills. Furthermore, it developed maturity and self-knowledge in our students. Therefore, from pedagogical perspectives: including this form of assessment fostered independent and lifelong learning, and students became able to design their research findings.

This work indicates that flexibility in assessment allowed students to take a proactive role in their learning. When the assessment activities designed to develop creativity and critical analysis, this assessment strategy was effective in developing higher order thinking skills. Also, this type of assessment seems working in these unprecedented times during the COVID-19 pandemic. Questionnaire results indicated that this assessment helped students make friendships and socialise during the lockdown.

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