

Authentic assessment design for meeting the challenges of Generative Artificial Intelligence

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Abstract—Authentic Assessments are generally seen as alternate to traditional assessments though the scope of an authentic assessment is much larger than that of a traditional assessment. Authentic assessments help students in comprehending the subject matter and, if properly designed, can also ensure student workplace readiness. During the authentic assessment design, five most important aspects are considered and their incorporation is sought. These aspects include; the assessment objectives, the physical context of an assessment, the social context, the outcome of the assessment and the assessment criteria. Emergence of the Generative Artificial Intelligence (GAI) supported applications and the Large Language Model (LLM) tools has posed new challenges to the authentic assessment design. Student access to these new applications and tools has also changed the socio-technological realities of the Learning and Teaching (L&T) practices. Therefore, we need to reimagine both, the L&T practices and the design and execution of authentic assessments. Keeping the prevailing socio-technological context in perspective, this work in progress paper proposes extending the scope of authentic assessments. The aim is to use them for quelling the growing problem of plagiarism as plagiarism can be facilitated by the use of GAI and LLM tools. Instead of considering authentic assessments as merely ‘an alternate to the traditional examination’ or ‘a tool for evaluating student workplace readiness,’ we propose adding ‘GAI redundancy’ to the scope of authentic assessments. For incorporating GAI redundancy we propose using either the game-based learning environment or a simulation environment. These two environments can be used for generating ‘close to real life’ problem-solving scenarios while assessing student comprehension and workplace readiness. In order to help practitioners, this paper also presents two examples of authentic assessments that were developed for combating plagiarism vis-à-vis enhancing student learning and evaluating their workplace readiness. In the first example, we show how to use a game environment and in the second example we demonstrate use of a simulation environment. The two examples also show how course contents can be embedded and how GAI redundancy can be incorporated in authentic assessments. The reported teaching assessment data and student feedback suggest that the proposed authentic assessment design and implementation strategies were able to engage students, help their comprehension and evaluate their workforce readiness.

Keywords—authentic assessment design, generative artificial intelligence, large language models, plagiarism, student competence, workplace readiness

I. INTRODUCTION

Recent outcry over the use of Generative Artificial Intelligence (GAI) and Large Language Models (LLM’s) in assessment of learning, resulting in plagiarism, is becoming evident in learning and teaching (L&T) literature [1, 2]. For example, authors in [3] stated, “*In a world where convincing chatbots are readily accessible, the very nature of attribution and original writing is called into question. As technology continues to advance, it becomes increasingly difficult to determine whether a piece of writing is truly original or if it has been generated by a machine. This raises questions about the value of originality and the importance of properly crediting sources in the digital age. It also highlights the need for individuals to be more critical of the information they consume and to carefully consider the sources of the information they share.*” On a different note, authors in [4] encouraged students to use a LLM-supported application chatbot (via a front-end application called *Ikastenbot*) for reviewing their technical reports and correcting any grammatical and linguistic mistakes.

The two aforementioned citations reflect on different reactions to the availability of various GAI tools and applications like Amazon’s LLM Titan, Google’s Bard (LaMDA) and OpenAI’s ChatGPT [5]. There is a general consensus that GAI and LLM technologies have brought new challenges to the L&T practices, learning approaches, and academic publishing. Academics realize that new approaches need to be used to meet these challenges in order to ensure student comprehension of the subject knowledge and develop their skills of applying the taught concepts for solving real-life problems [6]. Consequently, academic leaders and instructors are now forced to restructure course delivery schemes, revise student engagement methods, develop new progress monitoring tools and design new assessment plans [2].

Authentic assessments have long been used as tools for connecting curricular contents to the workplace requirements and ensuring student readiness to perform in real life [7]. The term ‘authenticity’ in authentic assessments refers to the extent to which an assessment relates to the real-life application of knowledge [6]. However, as reported in [6] and [8], authentic assessments need to be considered an alternate to the traditional examinations. For example, authentic assessments require portfolio evaluations for judging the professional competence and readiness of medical science students [9]. The literature suggests that additional benefits of authentic assessments include better quality and depth of student learning, development of high-order cognitive skills and, commitment and motivation for learning [10].

Authenticity is the most important aspect of an authentic assessment. Generally, authenticity encompasses contextualisation, realism and problem-solving [10]. Contextualisation in authentic assessments emphasizes on application of knowledge for solving analytical problems. Realism requires application of knowledge for real-life problem-solving. Hence, authentic assessments can help in using the course contents for development of analytical capabilities, workplace readiness, and real-life problem-solving [11]. These features bring the authenticity to authentic assessments and help in enhancing the L&T process. Nonetheless, researchers still require and propose extending the scope of authentic assessments. For example, a recent framework [12], suggested incorporating five important dimensions viz., (1) the assessment task, (2) the physical context, (3) the social context, (4) the assessment result and, (5) the assessment criteria in authentic assessments.

This paper posits that the GAI and LLM applications pose challenges to the L&T practices as the social context of assessments has changed. With the advent of new and powerful GAI and LLM tools, practices pertaining to student cognitive development, competence and workplace readiness, need to be reimagined. We propose that the social context of L&T practices should now be seen as the “socio-technological context” and hence, the scope of authentic assessments should be extended. *In tandem* to the two widely used descriptions viz., ‘an alternate to the traditional examination’ and ‘a tool for evaluation of student workplace readiness,’ we propose adding ‘GAI redundancy’ to the description of authentic assessments. For incorporating GAI redundancy this work proposes using the game-based learning and problem-solving scenarios.

Building upon previous works [13-15], this paper presents two examples of designing and implementing authentic assessments. The two example assessments were used as alternate (authentic) assessments for evaluating student comprehension of the subject matter, workplace readiness and making GAI and LLM tools redundant. We also demonstrate how improvements in student engagement, performance and competence were achieved using the GAI-redundant authentic assessments.

A. Research Objectives

This research had two objectives: (1) developing methods for making authentic assessments sensitive to the prevailing socio-technological context and (2) developing tools that would increase student engagement, academic performance, competence and make GAI tools redundant.

II. QUELLING GAI AND LLM APPLICATIONS

A. Supportive L&T Environment

The assessment design influences both, the learner and the instructor. Assessments let learners decide what parts of the course contents are important. Instructors use assessments as tools for imparting skills and developing student competence [16, 17]. Therefore, assessments are referred to as the *de facto* curriculum [17, 18]. GAI and various LLM applications are capable of assisting students in completing tasks and generating answers for the questions posed in a traditional setting [19]. Based on some recently published works [20, 21], LLM’s can assist students in:

1. Conversing and communicating;
2. Explaining thoughts and ideas;

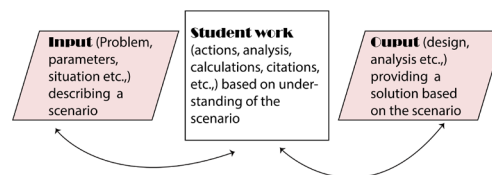


Fig. 1. Meta-level architecture of the authentic assessment facilitating interaction and iteration.

3. Understanding words, sentences, paragraphs and larger amounts of texts;
4. Understanding questions and answers embedded in text;
5. Inferring and generating solutions using inferences;
6. Incorporating new vocabulary and improving grammar text;
7. Interacting and learning in a dynamic environment;
8. Writing summaries;
9. Planning essays and projects; and
10. Composing articles.

Consequently, while GAI and LLM tools can help students, they can also be used to avoid rigor in learning. As such, GAI and LLM tools would deter real learning and impede student readiness for the workplace [1, 4].

Authentic assessments, when supported by a simulation- or game-based environment, can be used for demonstrating how to perform a task [13]. They reinforce student understanding of what would be required for completing the task in a real-world scenario. Furthermore, computer games provide the flexibility of using graphics, audio, sound effects, animations, interaction tools, virtual and immersive environments, and time-based activities. Hence, computer games are used for defining assessment tasks and implementing authentic assessments. Game environments can also assist in relating tasks with the course contents and professional context. Availability of several easy to use and low-cost design tools such as CoSpaces Edu [22], eCraft2Learn and Aurora toolset make it easy for instructors to construct authentic assessments in a game environment [23].

Authors in [24] provided empirical evidence suggesting that the cognitive and psychomotor abilities developed by playing computer games remain transferable. Hence, the cognitive and psychomotor abilities developed by playing games can be applied in real-life activities, academic endeavours and professional works. Following such leads, we see interactive learning environments as L&T ‘supportive’ environments and use them for developing authentic assessments that won’t require using GAI and LLM tools like Titan, LaMDA and ChatGPT. We consider this work as a step forward toward making the authentic assessment relevant in the emerging socio-technological context.

B. Foundations of Authentic Assessments

Motivation for developing authentic assessments and their design guidance came from discussions following the ASME Vision 2030 release [25]. While planning authentic assessments, the following two important questions were kept in mind:

1. After informing the potential employers (interviewers) about the final year electives

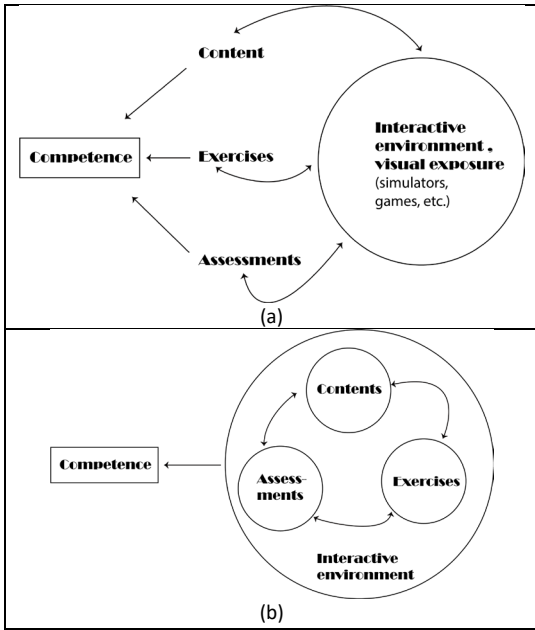


Fig. 2. (a) A meta-level description of the socio-technological context of the insensitive authentic assessment that cannot make GAI and LLM tools redundant. (b) A mental model of the socio-technological context sensitive authentic assessment that would make the GAI and LLM tools redundant.

students complete, what questions interviewers would pose to an engineering graduate who would be interviewed for a job?

2. After arriving the workplace, what tasks a recent engineering graduate may be required to do?

In order to address these two questions, a meta-level architecture of authentic assessments (shown in Figure 1) was developed. Note the double arrows in Figure 1 indicate interactivity and iterations.

For implementing the authentic assessment, a mental model designed after the one proposed in [26] (see Figure 2), was adopted. As shown in Fig. 2(a), the interactive L&T environment remains separated from the course contents, exercises and assessments thus allowing students to look for GAI and LLM tools. We attempted to replace this environment with a more holistic L&T environment that would have all essential elements of the L&T process included in it, and won't require students to look for GAI or LLM tools as shown in Fig. 2 (b).

III. THE TWO AUTHENTIC ASSESSMENTS

The first authentic assessment was designed for a final year elective unit (a unit in Australia is called a course or a subject in different countries) "Sustainable Energy Systems and Technologies" offered to the Mechanical and Mechatronic Engineering students at Curtin University, Western Australia. The course covers energy efficient operation of systems and processes. An authentic assessment was used for teaching how to: efficiently operate an industrial boiler, use combustion and flue gas analyses to control the operational parameters, perform energy efficiency calculations, and evaluate student performance.

The second authentic assessment was designed for a final year core unit called "Mechatronic System Design" offered to

the Mechatronic Engineering students. Students in this unit were provided with a simulated environment that could help them in visualizing 'joint parameters and related link positions' to comprehend forward and inverse kinematics. Student understanding of concepts pertaining to: frame assignments, links and joint movements, D-H parameters and use of fixed and Euler angles was reinforced. The authentic assessment was designed to judge student knowledge of robot kinematics while making GAI tools redundant.

We measured success of each environment using students' post-assessment interviews and their feedback on the authentic assessments.

A. Authentic Assessment 1

Authentic assessment 1 was implemented in an interactive environment that presented students with the reading material, related questions and answers aimed at introducing fundamentals of: the combustion process, boiler efficiency and, boiler efficiency calculations. Table I provides details of the topics covered.

1) Simulator design and methodology

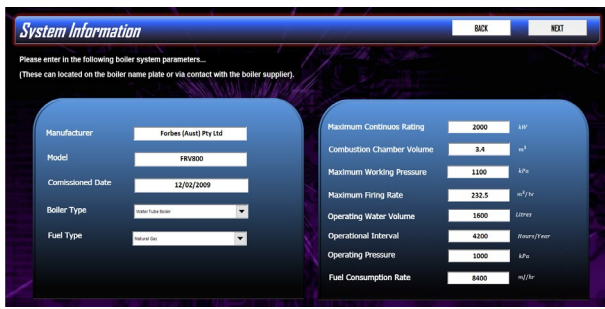
The simulation environment for authentic assessment 1 was developed for students to operate a package boiler under standard operational conditions. Figure 3 shows four user interfaces of the simulator. The simulator has seven interactive screens covering various stages of boiler efficiency analysis. The user is provided with the boiler system information, is offered an opportunity to set: the fuel specifications, boiler's operational parameters, combustion parameters, boiler efficiency analysis results and, results showing financial analysis. Finally, a screen is made available to the user showing the environmental impact of operating the boiler in the given conditions.

During the initial tasks, student is asked to change either the fuel specifications, boiler's operational parameters or the blowdown parameters to examine how these parameters influence the boiler efficiency. Gradually, difficult problems are posed to improve student competence. The tests are time-based requiring the simulator to let student complete each task in a limited time. This purpose-built and task-oriented game environment neither requires nor provides an opportunity of using a GAI/LLM tool. Hence these assessments make GAI redundant.

B. Authentic Assessment 2

The second authentic assessment was meant to (1) help students visualize joint and link positions to comprehend forward and inverse kinematics, (2) understand how joint and link parameters are seen as D-H parameters, and (3) assess student knowledge of robot kinematics. The teaching material, exercise and assessments for the second L&T environment were taken from [27]. Students were provided with Dobot Magician, a serial chain robotic manipulator [28]. The authentic assessment included three tasks requiring students to write an apt pieces of codes within the Robot Operating System (ROS) environment [29] for manipulating the Dobot.

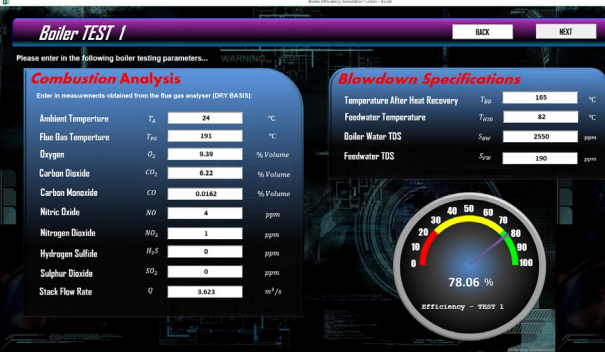
Task 1 of the three tasks required creating a launch file to build an drun a user interface window enabling use of the 'dobot.urdf' file description for controlling a robot_state_publisher node and a Rviz node. This task enabled visualising the Dobot based on the description given in a Unified Robot Description Format (URDF) file.



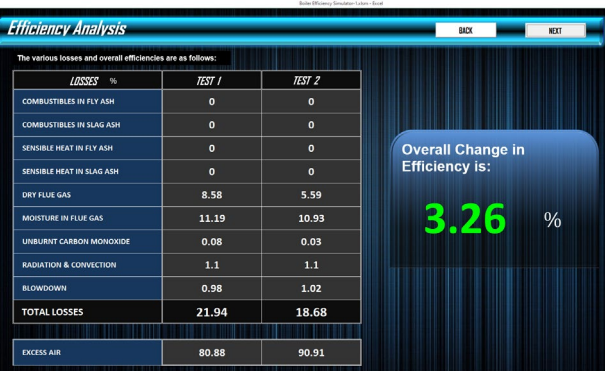
(a)



(b)



(c)



(d)

Fig. 3. (a) operational details of the boiler are presented to let student recall the factors influencing boiler efficiency. (b) Fuel specifications help students recall fuel related knowledge. (c) Results of combustion analysis and blowdown details are presented. (d) Boiler efficiency analysis and result of changing the operational parameters are presented.

Task 2 of the three tasks required visualizing the Dobot in Rviz such that the pose of the physical Dobot could be mirrored in real-time.

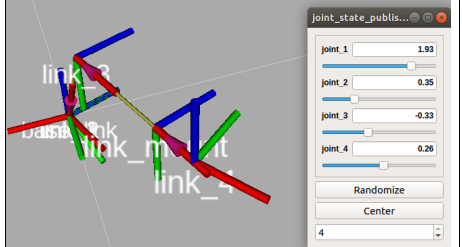
Task 3 required physically controlling the Dobot from within a user interface window by setting the goal states and simultaneously visualising them in Rviz. Prior to the beginning of the assessment, students had the opportunity to visualize the robot operation in RoboAnalyzer, a 3D model-


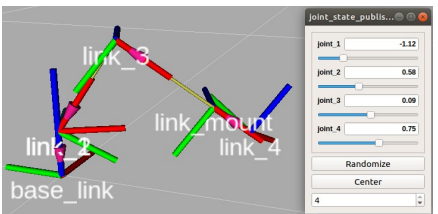
based software that allows visual inspection and simulation of serial chain robotic manipulators [30].

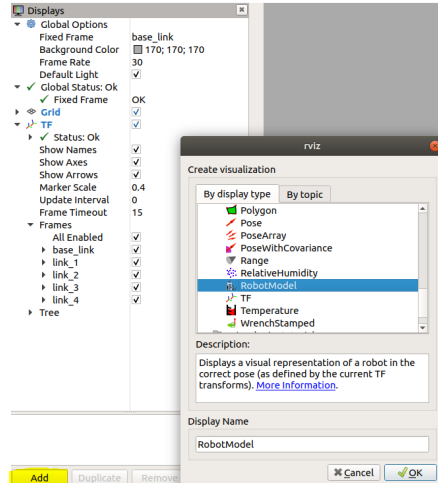
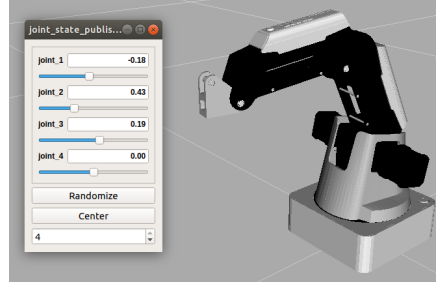
Embedding all instructions, relevant information and exercises in these tasks would let students accomplish these tasks without seeking help from any external source or GAI-enabled application. Students were familiarized with the process of creating ROS nodes (executable files) by completing the preceding laboratory sessions. Publishing the goal states of a robot is an important task in the ROS development environment as many ROS tools use goal state messages. Some mathematical concepts were reinforced in this task by using both Cartesian and joint space data. Completing these tasks would enable students to command the robot into any goal state just by publishing a message in ROS containing that goal state. Below given Table II (continued on the next page) presents steps of completing the two tasks and implicitly shows how GAI applications were made redundant.

1. Boiler efficiency	11. Analysing flue gas composition
2. Energy losses in a boiler	12. Heat transfer surface fouling
3. Excess air rate	13. Blow down (solid concentration)
4. Burner control	14. Blow down (Intermittent and continuous)
5. Firing rate	15. Blow down control
6. Burner operation	16. Blow down heat recovery
7. Flue gas temperature	17. Steam Pressure
8. Feed water temperature	18. Exterior heat losses
9. Condensate recovery	19. Effects of fuel type
10. Intake air temperature	20. Models of heat loss calculations

TABLE II. AUTHENTIC ASSESSMENT 2 TASKS

Step	Details	
	Instructions	Marks
1	<p>Use <code>roslaunch display inspect_urdf.launch</code> to launch the file <code>inspect_urdf.launch</code> within the <code>/display</code> package. Two windows should open. One of these should be a GUI containing four labelled sliders. The second one would be an <code>Rviz</code> window, which shows the link frames of a robot. Observe how the GUI interacts with the visualisation in <code>Rviz</code>. Pay attention to the differences between the visual display and experience and the way that the joints of the Dobot move its arm. Record your observations in the logbook.</p> <p>Show the two windows to a tutor. Your window would look like the below shown screenshot. Produce a <code>rviz_graph</code> and comment on the flow of information in your logbook.</p> 	4
2	<p>Open the launch file and examine its contents. In another terminal window, use <code>rosnode list</code> and <code>rosnode info</code> to inspect the active nodes. Do the</p>	4

Step	Details	
	Instructions	Marks
	<p>same with 'rostopic list', 'rostopic info', and 'rostopic echo'.</p>  <p>The specific information about each joint and link comes entirely from the file 'dobot.urdf'. This file contains a description of the Dobot's joint and link structure, but with no visuals or 3D models. Take note of the 'origin' tags for each joint in the URDF file and compare these with the transforms between each link of the Dobot as recorded in the previous milestone.</p> <p>Show your work and functionality of your program for claiming the three hexagons.</p> <p>Print the rqt graph and comment on the flow of execution to claim the standard mark.</p>	
3	<p>Modify the URDF to change the limits of joint_1 to match that of the actual joint in the Dobot workspace. Also change the position of the origin of joint_1 such that it is 128mm above the base_link frame. Run the launch file again and observe these changes. You would see something similar to the below screenshot.</p>  <p>The two hexagons belong to the modifications in the URDF file.</p> <p>Show your screen to a tutor for claiming the standard mark.</p>	3
4	<p>Another URDF file with the name "dobot_visuals.urdf" is provided. This file contains 3D models of the Dobot but descriptions of the joints and links differ from the four joint models defined previously.</p> <p>Make a copy of the inspect_urdf.launch file and name this copy "inspect_visuals_urdf.launch"</p> <p>Edit this launch file, doing the following:</p> <p>Rename the "robot_description" parameter to "robot_visuals_description", and change its value to take from the "dobot_visuals.urdf" file.</p> <p>Add the 'remap' tag to the joint_state_publisher_gui node, remapping the "robot_description" parameter to the newly defined parameter. This means the node upon launch will source the URDF from the file listed under "robot_visuals_description".</p> <p>Also add the remap tag to the robot_state_publisher and to rviz nodes.</p> <pre> <node name="joint_state_publisher_gui" pkg="joint_state_publisher_gui" type="joint_state_publisher_gui" > <remap from="robot_description" to="robot_visuals_description" /> </node> </pre> <p>This will cause the robot_state_publisher node to use the description from the robot_visuals_description parameter you have just defined. Add this same remap tag to the Rviz node.</p> <ul style="list-style-type: none"> Show the launch file modifications for claiming the standard marks. The other two modifications carry the other two marks. 	4
5	<p>Launch the new launch file you created earlier.</p> <p>In the Rviz window, add a new 'RobotModel' display, and disable the view of the 'TF' frames.</p>	4

Step	Details	
	Instructions	Marks
	<p>You should see a visualisation of the Dobot and be able to move its links using the GUI window. Save your Rviz configuration to the config folder, giving it an appropriate name.</p> <p>Now modify the launch file to use this Rviz config instead of dobot_tf_only.config. When this launched, the Rviz display configuration will be set to whatever settings you had selected. For example, see the below screenshot. Show your modifications and screen to a tutor.</p> 	
6	<p>Examine the contents of the gui_visualise.launch file. Look at the joint_visuals_converter.cpp file and note how it is used by the launch file.</p> <p>Add features to the launch file for constructing a robot_state_publisher node, remapping its "robot_description" parameter to a new parameter (you create) that contains the dobot_visuals.urdf file. Also use a similar remap tag to change its "joint_states" parameter, which is its input topic, to the name of the topic which joint_visuals_converter publishes to. Also, add to the launch file an Rviz node, which also remaps "robot_description."</p> <p>Show your modifications and screen to a tutor.</p> <p>The resulting launch file should open a GUI based on 'dobot.urdf' which controls the visualised 'dobot_visuals.urdf' in Rviz.</p>  <p>Using the rqt_graph, examine the active nodes and topics and comment on them in your logbook (1 mark).</p>	3

Step	Details	
	Instructions	Marks
	Show your work and screens to the tutor (2 marks).	
7	<p>This task requires creating a new Python or C++ file, similar to the <code>'joint_goal_publisher.cpp'</code> available in the <code>/display</code> package. This node should construct an object containing a subscriber to the <code>/joint_states</code> topic output by the <code>joint_state_publisher_gui</code> node. The callback function of this subscriber should save the most recently received array of joint states as a private class field in the <code>JointState</code> message format.</p> <p>The main function of this program is to loop a prompt to the user, and wait for the user input. Once this input is received, a function should be called on the class object. This function should publish the stored message. Refer to previously provided and created C++ files in these task sets for hints when writing this program.</p> <p>The below line of code will wait for terminal input from the user (user input is finalised when the Enter key is pressed).</p> <pre>std::cin.ignore();</pre> <p>You will need to include the C++ library <code>"<iostream>"</code> for this task.</p> <p>Show your code to the tutor (2 marks) Demonstrate the functionality to a tutor (2 marks).</p>	4
8	<p>Create a launch file that sets up all necessary nodes (including ones built previously) and sets up a GUI that simultaneously controls the <i>Dobot</i> pose as it is visualised in <i>Rviz</i>. This launch file should create a <code>joint_state_publisher_gui</code> based on the <code>'dobot.urdf'</code>. The <code>/joint_states</code> message output from this will be used by two sources: one which is converted and used for visualisation in <i>Rviz</i> in real-time, and another which <code>'joint_goal_publisher'</code> receives and publishes as joint goal states when user input is received. Use the nodes created earlier to process the joint pose goal states into PTP commands, which are eventually communicated to the <i>Dobot</i>. See the illustrations on the following page.</p> <p>Show your code/ files to the tutor (2). Show functionality and screenshots to the tutor (2 marks).</p>	4
<p>Note: A sample <i>rviz</i> graph is given. Examine it to understand the functional and structural details of the above tasks.</p>		

IV. RESULTS

Tables III and IV present the preliminary data gathered during the teaching weeks 9, 10 and 11 of the semester. As the semester was not over in these weeks and official student feedback was not available, informal interviews were conducted to get student feedback on the effectiveness, L&T success, quality of assessments and overall learning experience in teaching.

In both teaching units, a great majority of students was happy with the modes and modalities of assessments. In both units, students were also satisfied with their respective levels of accomplishments. The official student feedback was released on 12 July 2023. Student feedback on assessments (without any editorial changes) is provided in the following paragraphs.

The following three qualitative comments in MCEN4012 were highly positive showing student satisfaction with the nature and scope of authentic assessment 1.

Question asked	Total Students	Said No	Said Not Sure	Said Yes
Were the assessments engaging and rewarding?	38	5	6	27
Were the assessments helpful in developing your understanding of the subject?	41	6	6	29
Did you feel a need to use GAI tools for solving the assessments?	38	19	11	7
Could you do better if the GAI tools were available for solving the assessments?	39	19	15	5
Could you perform better in an invigilated examination (In terms of preparation and answering questions)?	40	19	7	11
Could you perform better in a take home examination?	38	10	7	19
Did you find assessments educational and informative?	41	5	6	27
Are you satisfied with your level of accomplishments in the authentic assessments?	41	5	4	28

1. The assessments were relevant and I found out more about the areas of interest I liked.
 2. Interesting topics that were captivating to learn.
 3. The content of the course was good.
 4. Simulating power system in assessment 1 would have been a very interesting assignment.
- The following three qualitative comments in MCEN4012 were highly positive showing student satisfaction with the nature and scope of authentic assessment 1.

Some respondents in MCEN4012 expressed either mixed or negative views about the authentic assessments. Their qualitative remarks are provided below.

1. The assignment tasked seemed very weird. Not really that engaging and felt like a chore to complete.
 2. Although intriguing topics were explored, there was a lack of cohesion between the lecture slides and notes, which did not align with the questions asked in the assessments.
 3. Felt that some of the assessment requirements were quite ambitious for the mechanical engineering students.
 4. While doing the assignment it felt like researching only.
- Similarly, respondents in MXEN4001 expressed positive, and negative feelings about the nature and scope of authentic assessment 2. Their positive remarks are appended below.
1. I appreciated the help during the labs.
 2. Assessments were easy to follow. Really appreciated the fact that you were very hands on.
 3. Workload adjustments ensured a majority of students could complete the tasks.
 4. The requirements for each assessment are well outlined.

TABLE IV. MXEN4001 STUDENT FEEDBACK				
Question asked	Total Students	Said No	Said Not Sure	Said Yes
Were the assessments engaging and rewarding?	60	2	5	51
Were the assessments helpful in developing your understanding of the subject?	52	3	4	53
Did you feel a need to use GAI tools for solving the assessments?	54	44	3	6
Could you do better if the GAI tools were available for solving the assessments?	57	33	8	6
Could you perform better in an invigilated examination (In terms of preparation and answering questions)?	60	44	4	5
Could you perform better in a take home examination?	57	40	5	6
Did you find assessments educational and informative?	61	3	5	53
Are you satisfied with your level of accomplishments in the authentic assessments?	61	4	3	54

- It took me a while to understand but the robot analyser was a good way to visualise the transformations of joint coordinate systems. Finally understanding the ROS environment and getting the Dobot to move in the final lab was very rewarding.
- The workload was very fair and required us to apply what was learned in the lectures in a practical format.

The mixed comments in MXEN4001 assessment provide insight into what was missing in the authentic assessment. Below given student comments are self-explanatory.

- The lab content was fully self-taught with help only obtainable from those sessions and shared very little direct correlation with the lecture content.
- I understand the unit was being updated throughout the semester but some more detailed requirements in the assessments would be nice.
- If robot analyser is to be tested again, some practice questions to familiarise oneself with the program.
- Provide some more practice questions and worked solutions.
- Also like all of these assessment, the lectures are very disconnected from the labs, with very little overlap.
- The second task was an abomination and completely disconnected from the rest of the unit.
- The assessments for the second task seemed to have very little to do with what we were learning in the labs.
- No resources for proper understanding of the computer dobot program.

- Assessments were not as described in the unit outline and changed with very little notice or explanation.
- Assessments were not representative of the learning outcomes.

Overall, the student satisfaction with the execution of the two units (MCEN4012 and MXEN4001) and the average of student marks in 2023 were much higher than those in 2021 and 2022. As obvious in the qualitative and quantitative student feedbacks, the GAI and LLM sensitive assessments were helpful in improving student perception of the two units.

This was our first experience of designing authentic assessments under the backdrop of GAI and LLM tools. Having a short response time, less experience and limited resources, we were able to extend the scope of authentic assessments and quell GAI and LLM facilitated plagiarism. This initial assessment design experience and student feedback will help in designing and implementing better and more effective authentic assessments in future.

V. CONCLUSION

The prevailing and emerging GAI and LLM tools will keep posing new and unprecedented challenges to student learning, evaluation of competence, workforce readiness and overall assessment of the pedagogical strategies. Hence, the current socio-technical context must be kept in mind while designing assessments. We presented two approaches used for developing and implementing authentic assessments in undergraduate Mechanical and Mechatronic Engineering units at Curtin University. Our intent was to make GAI-enabled tools redundant and let students learn, practice and, comprehend knowledge to solve real-life problems in an interactive, game-like environment. The informal and formal feedback gathered in the two units show that a good authentic assessment design can help in reducing student reliance on

GAI-supported tools. Our results also show that a carefully crafted and executed authentic assessments would help in developing skills, competence and work readiness.

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