

# Reimagining Constructive Alignment for Artificial Intelligence Integrated Learning - Looking into Agency

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## ABSTRACT

*Artificial intelligence (AI) tools have been at the forefront of technology, redefining higher education teaching and learning, including engineering education. Since the introduction of AI, concerns have grown about its impact on learner agency and the fairness of assessments. The traditional teaching and learning approach have since been reviewed and redesigned to incorporate AI and to ensure its ethical use. This thematic review explores two main themes: learner agency and AI in engineering education. Two strings of theme-related keywords were used for the database search. This review examines the effects of integrating AI in teaching to provide learners with greater control over their learning process. It argues that AI usage will not lower the quality of teaching if assessments are reasonably adjusted. Constructive alignment was identified as the central focus for evidencing learners' agency, and a reverse-engineered constructive alignment can preserve agentic engagement. Learners' contributions were most evident in the assessment element. Hence, assessment becomes essential, suggesting that it should serve as the starting point for constructive alignment. By involving learners in the process, teaching and learning will be more learner-focused. Strategies are suggested for creating assignments that are AI-integrated, encourage meaningful participation, and mastery of the subject.*

**Keywords:** Artificial intelligence, constructive alignment, engineering education, learner agency

## 1. INTRODUCTION

These days, artificial intelligence (AI) is no longer a new concept, but rather one that has been widely accepted and is being utilised frequently to automate tasks in the industry and education sectors [1]. The use is not limited to a particular field but rather interdisciplinary, including engineering education. AI can adapt to learners' individual learning needs, such as specific course content, pace, and delivery approach, making it a powerful tool for educators to design instructional learning designs, processes, and assessments. For some, AI is regarded as 'augmented intelligence', which represents its ability to perform specific tasks, acting as an assistive tool rather than replacing human cognitive skills [2]. AI has since become a powerful tool, providing robust applications that enhance the quality and satisfaction of teaching and learning by redefining how knowledge is obtained and disseminated. Although AI offers various alternatives to conventional teaching and learning activities, the underlying concern is its impact on agency, which encompasses autonomy, ownership, and decision-making actions that influence overall learning experiences.

### 1.1 AI in Education

The application of AI in education (AIEd) is emerging, with the number of AIEd research papers increasing by two to three times in recent years [3]. It is highly regarded for offering a transformative approach to ensure the attainment of learning outcomes, redefine the curriculum,

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develop creativity, support problem-solving, personalise learning, and foster critical thinking [4–6]. The interdisciplinary nature of AIED benefits from the interplay among three main domains: AI, learning analytics, and human learning processes [2]. Learning analytics involves the complete process of collecting, analysing, and interpreting data, demonstrating learners' ability to recognise and optimise learning [7,8]. Human learning processes encompass the cognitive, affective and psychomotor domains through which learners acquire and articulate knowledge [7]. The three components interact in a feedback loop, continually improving and enhancing the quality of teaching and learning with each cycle.

The integration of AI in the cycle introduces pattern recognition in multidimensional learning datasets, such as engagement metrics, error frequency, and independent learning time. Understanding these learning datasets helps in predicting learners' outcomes and subsequently recommends targeted intervention actions. This adaptive feedback system enhances the overall individual learning trajectories and provides cognitive support through personalised recommendations. Studies in AIED were seen as of interest in diverse fields, including engineering. In engineering, AIED is primarily used for complex simulations, virtual labs, problem-based learning, and smart-tutoring.

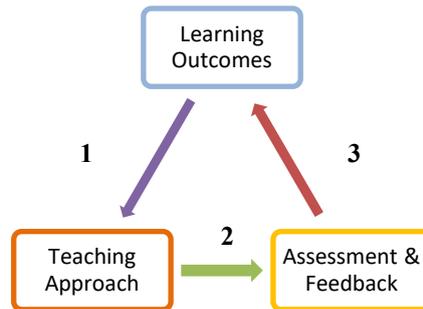
## **1.2 AI Demands in the Industry**

AI is also deemed essential to support the evolving demands of the engineering industry, with some companies now starting to leverage AI largely to assist in designing and optimising processes [1]. Some companies aim to hire candidates who are familiar with using AI, such as Large Language Models (LLMs), particularly in the field of prompt engineering. A study by Murray *et al.* explores practising engineers' perspectives on the use of LLMs in their work, highlighting that most use them as an assistive tool to explore task parameters, provide a landscape view, make ballpark checks, and organise information. The mid-level and senior engineers reported using it more than 60% of the time, indicating that they have gained tacit knowledge and experience to gauge the legitimacy and ethical use of AI. The study also underscores the importance of having an authentic curriculum that closely aligns with industry practices [1]. A redefined curriculum refocuses on employability, thereby maintaining a flexible approach to pedagogy. AI is not something to be avoided, but rather something to be embraced. A perceived gap exists in the current preparedness level for AI tools in the workplace [1]. This showed that AIED is inevitably central to reforming the way teaching and learning are conducted. Although equipping and guiding students to use AI appropriately and ethically are essential, a solid foundation in engineering knowledge is equally valuable. Having a solid foundation allows learners to take accountability and make the use of AI trustworthy. A trustworthy use of AI will enhance agency in learners as they reinforce critical analysis, stimulate their curiosity, and encourage them to question and reflect on the information they perceive. A strong foundation in engineering knowledge is key to the trustworthy use of AI and helps prevent the risk of hallucinations (when AI fabricates information). Ultimately, the goal is to prepare learners who can effectively exploit AI while maintaining their indispensable human qualities.

## **1.3 Domains for AIED**

The four main educational domains of AIED applications are teaching, learning, assessment, and administration [3]. Each domains act as a scaffold supporting the evolution of engineering education. AIED learning environment offers a mixed-reality system that can monitor active learning behaviours using interactive materials and AI chatbots. This helps learners improve their communication skills by facilitating human-machine dialogue. AI also facilitates analysis and feedback, offering thorough analysis and recommendations for enhancements in peer reviews. By tailoring learning paths, content and delivery strategies to each learner's needs, academic results, learner engagement, and retention have all increased. For educators, AIED functions primarily to reduce workload without compromising learning outcomes. It can

enhance teaching strategies by using adaptive, tailored content and teaching approaches. For administrative tasks, AIED is primarily used to enhance the management of the services platform, improve data security, and support informed decision-making with evidence-based insights. Although all domains are important, assessment is the determining factor to demonstrate the level of attainment of the set learning outcomes. Monitoring of attainment can be done through the constructive alignment process, which establishes a continuous relationship between teaching, learning, and assessment as shown in Figure 1. Constructive alignment is a framework developed based on constructivist ideas, where learners build knowledge through meaningful learning activities [9]. The alignment of the three main components of the framework ensures consistency. It is an iterative cycle that begins with setting out the intended learning outcomes.



**Figure 1.** Pedagogical framework of constructive alignment, highlighting three key elements: learning outcomes, teaching approach and assessment and feedback.

#### 1.4 Challenges in AIED

Despite its numerous advantages, AIED also presents several challenges. One of the most significant issues is the ethical considerations surrounding the use of AI in assessments. Learners and educators often lack clear guidance on how to use AI appropriately. Various studies report that students view AI tools such as ChatGPT and Copilot as convenient aids for completing assignments and revising for studying [10,11]. But they also raise ethical and pedagogical concerns about potential academic misconduct, as well as performance inflation, which can jeopardise their study [12]. Moreover, the use of AI increases the possible issue of data handling, for instance, managing sensitive learner data. Additionally, there is a potential for AI algorithms to reinforce bias if they are not carefully designed or validated.

An over-reliance on automation in AIED poses a risk of dehumanising education if AI replaces rather than augments teacher judgement and learner agency [13]. Automation may undermine learners' self-regulation and autonomy, depriving them of the opportunity to acquire new skills. Moreover, educators encounter difficulties in assessing learners' progress when AIED tools are overused. They must rely on learners' feedback, submission, and self-regulation to steer the learning trajectory, which decreases their monitoring efficacy. Furthermore, most automation tools in AIED suffer from a "black box" nature, where the response is generated based on the input entered [14,15] and fail to provide transparent explanations of the criteria or algorithms used to derive those responses. As a result, learners may struggle to understand or trust the outcomes presented [16].

Hence, the central question arises: how do we leverage AIED to enhance learning while preserving the critical and ethical reasoning essential to engineering practice? This paper argues that rethinking assessment is the key to reimagining constructive alignment for AI-integrated learning. By emphasising process over outcome and context over generality, educators can design learning tasks that are both AI-informed and agency-rich. The research questions that arise from the literature study are:

1. Can the integration of artificial intelligence within assessment support the strengthening of the learners' agency?
2. What is the most effective approach to studying and assessing the integration of AI's influence on learners' agentic engagement?

## 2. METHODS

The thematic literature search was conducted using two search engines, Web of Science and Scopus. Two main themes were identified for this thematic review:

1. Learner agency
2. Artificial intelligence in engineering education

Two separate searches were conducted for each search engine to explore the two identified themes. Figure 2 represents the findings from the searches about the subject area. Two keyword string combinations were:

1. Learner agency+ engineering education+ higher education
2. Artificial intelligence+ learner agency+ engineering education

From the searches, for the first string of keywords, Web of Science showed 45 results, and Scopus showed 73 results based on research areas. For the second string of keywords, Web of Science yielded 9 results, while Scopus returned 19 results. These results were further refined through title and abstract screening. This led to the selection of the 35 most relevant papers of the literature being reviewed. The reasons for exclusion were that some documents were included because of the generic term used in their title, such as 'child' or 'students', but they were not intended for higher education levels, but instead for the school level. It can also be seen that most studies were within the disciplines of educational or social sciences, accounting for more than 40%, and computer sciences, accounting for more than 35%.

## 3. RESULTS AND DISCUSSION

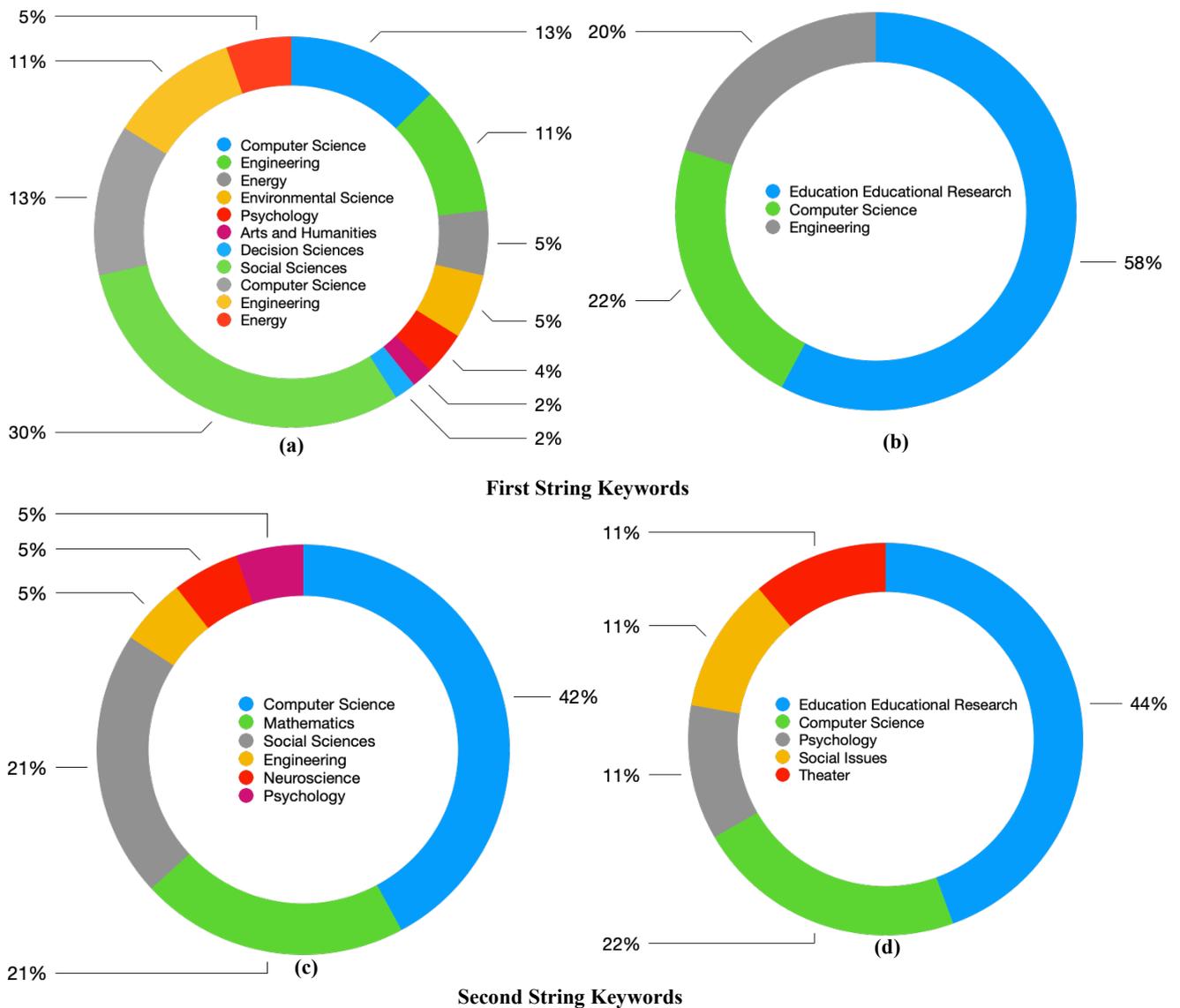
### 3.1 Agency Through AI-integrated Assessments

The integration of artificial intelligence (AI) into assessment is a dynamic process regarding the potential of AI to enhance learner agency. Despite the opportunities AI presents to strengthen aspects of the learning and assessment process, it also poses a substantial hurdle that undermines learner agency and critical thinking. Both positive and negative impacts will be discussed.

#### 3.1.1 Promotes a process-oriented approach

Learner agency refers to an individual's ability to set goals, make independent choices, and take autonomous action regarding their learning [17]. The integration of AI in assessment has been shown to support learner agency through various approaches. For instance, AI-integrated assessment promotes a process-oriented approach rather than an outcome-oriented one [18]. Conventionally, assessment emphasises the end-product of learning, focusing on grades and correct answers, and provides a snapshot rather than a trajectory of understanding. Hence, feedback tends to be delayed and less personalised. With AI-integrated assessment, the learning trajectory and process evaluations are prioritised [19]. For instance, the process of designing a heat exchanger in a capstone project will benefit not only the final design but also the skills acquired throughout the process. These skills include the ability to self-regulate, find data from various sources, evaluate and verify calculations, synthesise knowledge and articulate the design

coherently. AI is seen as an assistive tool for transitioning assessments towards these process-driven skills that help create agency.



**Figure 2.** Summary numbers of journal publications by subject area for Scopus (a) and (c), and Web of Science for (b) and (d) for String 1 and String 2 keywords.

### 3.1.2 Importance of feedback

In assessment, giving feedback is an essential part, particularly when emphasis is placed on the learners' trajectory and process [3,20]. Available technology, such as Intelligent Tutoring Systems (ITS) and Adaptive Learning Management Systems (ALMS), can offer rapid personalised feedback in an instant [20,21]. AI powers both systems to enhance the learning experience and to provide constructive feedback to students. The AI-generated feedback frequently challenges learners to critically evaluate the content in terms of its correctness and relevance. This practice of assessing AI-generated feedback has fostered independent thought and emphasised learners' ability to make judgments, which are essential components of agency. The individualisation of instruction and the adaptive learning system using AI enable the tailoring of content and resources to meet learners' needs [22]. Learners' data can be analysed to suggest preferences, needs and progress.

The provision of relevant and timely assistance for learners enables a personalised learning experience, boosting autonomy and engagement [8].

### ***3.1.3 Facilitates the learning process***

Equally, by integrating AI within assessment, it can facilitate problem-solving by acting as a personal tutor or co-creator alongside learners, particularly in activities that involve development, designing tasks or programming. Learners can be led and encouraged to ask relevant questions and prompts to get authentic responses from AI. This process is known as prompt engineering. This is an essential ability for properly utilising AI and developing agency in the process of knowledge conception. As learners actively engage with AI tools, they exhibit high levels of inquisitiveness, resulting in enhanced agency [23]. By utilising AI tools effectively, learners can develop a more profound sense of self-confidence and self-efficacy, particularly when guided in an organised manner and when experiencing favourable outcomes. Self-efficacy shows a direct correlation with higher behavioural intentions to employ AI technology, improved motivation and learning success. This self-assurance in using AI to complete assessments empowers learners to exert greater control over their learning processes.

## **3.2 Concerns and Obstacles of AI-Integrated Assessments Towards the Agency**

While there are potential benefits, several significant issues can impede or weaken learner agency when AI is integrated into assessment. Over-reliance on AI will eventually lead to a decrease in independent thought. Learners may tend to rely on AI-generated solutions, thereby avoiding in-depth engagement with challenges, critical thinking, and autonomous problem-solving, the essential components of an authentic learning experience [23,24]. As a result, the focus may shift from being inquisitive to being motivated to complete tasks as quickly as possible. This will remove the cognitive learning experience that learners are expected to gain. When learners are faced with a situation that requires verifying the reliability of an AI-generated response, they may mindlessly trust the outcome to avoid exerting cognitive effort [12,20]. This act creates a 'false sense of security' for learners, which is a concern that educators need to address by ensuring that AI augments human thinking, rather than replacing it [22].

### ***3.2.1 Depersonalising acts***

Besides the over-reliance on AI-generated responses, the excessive use of AI in education, including assessment, runs the risk of depersonalising the learning experience by diminishing the essential human interactions that occur between educators and learners [22]. Currently, the AI systems are unable to replicate these human interactions, which are necessary for nurturing emotional and social growth. Equally, these interactions are key to the transactional learning approach, which highlights that teaching is not done to learners but with them. This principle is rooted in the constructivist and social constructivist theories [24]. A transmission learning approach, which focuses on learners passively receiving knowledge, can be detrimental to the development of higher-order cognitive skills compared to a transactional learning approach [25]. In addition to the concern of dehumanising learning, AI-integrated assessment may limit creativity by standardising work. Especially the "canned and standardised" support that AI systems tend to provide [18]. This over-standardised learning process confines learners to options that limit their engagement in exploration, discovery, and genuine creativity, ultimately hindering their ability to complete the assessment. Although AI can contribute to the expansion of knowledge and assist in the creation of ideas, it cannot replace the self-discovery that is integral to basic creative processes and is necessary for human development.

### **3.2.2 Uncertainty of "black box"**

Additionally, concerns exist regarding the lack of responsibility and transparency regarding the "black box" aspect of AI algorithms [26]. Learners may struggle to comprehend the AI decision-making process due to its "black box" aspect. Learners can potentially use hallucinated AI responses for their assessment submissions, which can lead to significant responsibility difficulties [27]. It also creates ambiguity relating to academic misconduct and can lead to serious consequences. The AI algorithms can inherit systemic biases that are present in their training data. This can result in unfairly generated outcomes and increase educational disparities. The disparities may escalate the digital divide between learners who require more assistance, struggling to interact with AI tools and learners who are capable and motivated. The benefits of AI in education seem to accrue disproportionately to learners who are more capable and motivated to use it.

### **3.3 Exploring the Influence of Agentic Engagement within AI-Integrated Learning**

The influence of AI-integrated assessments on agentic engagement is reflected through a broader consideration that encompasses aspects such as technology, cognition, social interaction, and values [18]. It also aims to appreciate the complex relationship between humans and AI, recognising that AI can both support and degrade learners' agency. As defined earlier, agency is fundamental for fostering meaningful learning experiences. These include aspects such as self-regulation, critical evaluation, decision-making, interactions and communications. Agentic engagement is when learners actively participate and constructively contribute to their learning process. This includes asking questions, offering suggestions and seeking clarification. It is a shift from passive reception to proactive involvement. Broadly, it is an intentional, self-generated, and manifest ability to interact with the learning environment. Strategies to conceptualise the agentic engagement include a multidimensional view of learner agency, a learner-AI symbiosis, and looking beyond skill development [19,28].

#### **3.3.1 Multidimensional view of agency**

Agency can be conceptualised as a complex, dynamic system that comprises three interrelated core components: the learner's sense of agency, agentic behaviours, and interactions with the situated environment. These core components correspond to subjective perceptions, decision-making, self-regulation, teamwork with peers, and interaction that empowers learners to influence their environment rather than passively reacting. The multidimensional view recognises agency and distinguishes agency as a dynamic aspect rather than a singular, fixed attribute.

The multidimensional view is established within two key theoretical frameworks that underpin it: the social-cognitive and temporal frameworks. The social-cognitive framework suggests that agency serves as a mediating factor linking intentionality, self-reflection, and self-efficacy through three critical dimensions, intrapersonal, behavioural and environmental [13]. These dimensions establish the cognitive, affective, and motivational elements that define how learners self-regulate through the act of planning, organising, goal setting, and making choices that affect their response to surrounding interactions. Conversely, the temporal framework emphasises the learning process timeline, past experiences (iterative dimension), present enactment (practical-evaluative dimension), and future trajectories (projective dimension)[13]. For instance, learners' acceptance of specific assessments depends on their experiential knowledge of the task, engagement with current learning activities, and their future envisaged use of self-assessment.

Similarly, the multidimensional view acknowledges that agency is not always positive. Learners may display adaptive, maladaptive, or even a lack of agency [29]. It is paramount to recognise the continuous relation between social structure and individual agency, structure shapes practices,

and practices, in turn, constitute and reproduce these structures. For instance, the concept of "mass imagineering," which combines human imagination with AI-automated engineering, involves agency in deciding and designing the process [30]. However, the set assessment requirements limit the agency's scope. Overall, the multidimensional view of agency facilitates the integration of various dimensions of AI into teaching and learning activities. These shape the teaching and assessment style that encourages learners to make decisions, self-regulate, and critically evaluate practices.

### **3.3.2 Learner-AI symbiosis**

The learner-AI symbiosis refers to the synergistic integration of the learner and AI to augment and extend the learner's skills, rather than replace them [12]. The synergy involves designing AI systems as the front-end to perform tasks that learners find difficult. In contrast, learners complete the back end by engaging in thinking, judgment, creativity, and self-reflection [12,18]. This seamless collaboration can enhance learner cognitive performance, such as learning and problem-solving. The interplay between learner and AI is imperative to avoid designs that "rob learners of opportunity to self-regulate" [15].

The learner-AI symbiosis positively impacts learner thinking and creativity by extending and enabling the exploration of scenarios that are not readily encountered in real life. This leads to "AI-augmented thinking," which encourages learners to integrate AI into their thought processes, critically evaluate AI outputs, and apply them responsibly. The learner-AI symbiosis too can enhance self-regulated learning (SRL) [31]. It can scaffold learners' complex capabilities, such as self-regulation, through personalised feedback and data, supporting learners in developing SRL skills [32]. This supports tailored learning experiences by adapting content, pace, and individual needs, potentially increasing engagement, retention and performance [8].

Additionally, the synergy can provide just-in-time support, improving communication and the sense of connection, both in quality and quantity, especially when traditional human resources are inaccessible or intimidating [10]. The use of AI can assist in automating routine cognitive tasks, freeing learners to focus on higher-order activities such as sensemaking, meaning-making, and problem-solving [22,33]. This will empower learner agency and improve engagement by actively controlling AI tools and resources, facilitating dialogue, supporting exposure to diverse ideas, and fostering a more active role for learners [34].

Likewise, learner symbiosis can also lead to over-reliance and reduce independent thinking. An overly adaptive environment might lead learners to bypass deep engagement with problems and opt for AI-generated solutions. Excessive use of AI also depersonalises the learning experience and reduces human contact, which affects empathy and results in a transactional approach to learning. In short, learner symbiosis offers both vast opportunities to augment learner agency and poses substantial challenges that could undermine it. The essential factor lies in the intentional, evidence-informed, and human-centred integration that underscores human values, critical thinking, and active learning, rather than passively accepting automation [35].

### **3.4 Pedagogical Shifts to Foster Agency for AI-Integrated Learning**

Several pedagogical shifts are necessary to harness AI's capability while safeguarding learner agency. Primarily, redefining the role of educators, transitioning from only delivering knowledge to facilitators and collaborators in an AI-empowered learning environment and learner-as-leader paradigm. This involves educators working on pedagogical development and cultivating critical thinking while AI automates administrative tasks [4]. Educators need to be AI literate with essential training to integrate AI effectively into their teaching approach.

### **3.4.1 Learner's AI literacy**

Similarly, learners need to develop AI literacy to utilise AI productively. The curriculum needs to move beyond simply teaching AI literacies to explicitly teaching human-centred design, ethics and philosophy. AI literacy encompasses an understanding of AI functions, applying relevant concepts, evaluating applications, and considering the importance of accountability, transparency, ethics, and safety [36]. Additionally, prompt engineering, which is a crucial skill for interacting with LLMs, should also be included.

The AI-generated outcomes should be human-understandable, increasing their transparency and expandability. This will enable learners to verify AI's responses and understand the reasoning, promoting trust and allowing them to interpret the information critically. The AI-integrated learning should promote human-centred approaches that prioritise personalised and adaptive learning, with clear guidelines on ethics and usage [37]. The AI-tailored content should focus on creating knowledge through authentic, problem-based, and project-based activities, rather than solely gathering information. This includes dialogic learning, where educators encourage open discussion, extended responses, and support the use of AI, while also promoting collaboration and the exchange of ideas.

### **3.4.2 Educator's roles**

The active roles of educators within the learning process strike a balance between efficiency and a human touch. While AI can streamline tasks, the interpersonal relationships and communication exchange between educators and learners are a valuable supplement to human support for holistic development. This exchange of communication will ensure human contribution in AI systems' decision-making. This is particularly important for providing flexible solutions and achieving success, especially in high-stakes decisions. This facilitates learners' agency in virtual learning. AI systems should augment human intelligence and not replace human judgment.

Likewise, educators are expected to nurture self-efficacy, critical thinking and positive attitudes toward AI. These factors influence how learners interact with and evaluate AI responses. The broader socio-technical ecosystem and institutional policies must also support ethical and confident engagement with AI. A clear set of guidelines and policies instils confidence in learners to use AI and reduces uncertainty related to academic misconduct. AI tools can aid in distinguishing dialogue and types of interactions for authentic assessment purposes. In essence, pedagogical shifts are necessary, and the future of AI-integrated learning hinges on an intentional, evidence-informed, and human-centred approach. This requires cultivating human capabilities, designing AI systems that support critical thinking and autonomy, and establishing clear ethical frameworks. A robust evaluation method ensures that AI truly enhances the learning experience.

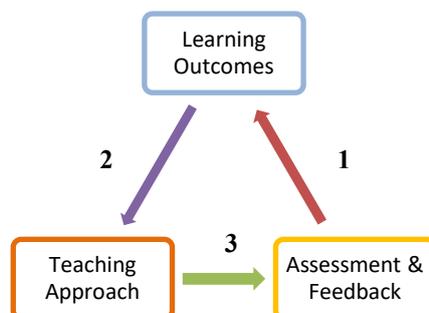
## **3.5 Reimagining Constructive Alignment for AI-Integrated Learning**

The AI-integrated learning highlights the importance of staying current with technology advancements while preserving authentic agency throughout the process. Several core aspects associated with AI-integrated learning to foster agency were identified from the review:

1. Self-regulation
2. Autonomous decision making
3. Problem-solving abilities
4. Critical thinking
5. Creativity
6. Motivation and engagement

These serve as the primary elements or learning outcomes for reimagining the constructive alignment process to align with AI-integrated learning and foster agency. This review suggests employing a reverse engineering process to align the constructive alignment with AI-integrated learning, as shown in Figure 3. The cycle begins with designing the assessment rather than setting

out the intended learning outcomes. As highlighted earlier, the application of AI in learning transforms the learning experience from a transmission to a transactional approach. This approach emphasises learners' participation and fosters agentic engagement. From the three elements of constructive alignment, learners' involvement is prevalent in the assessment, whereby they participate in the evaluation, and the results are fed back into the cycle to monitor attainment and improve the teaching approach. Therefore, by conducting reverse engineering, learners' input is incorporated into the pedagogical framework, and ideally, this will improve the alignment.



**Figure 3.** Reverse-engineered constructive alignment for AI-integrated learning.

Furthermore, designing the assessment first will determine the teaching approach to suit the learners' needs, which will include personalised content and adaptive feedback. This will boost learners' motivation, improve the learning trajectory, and promote deep learning. Likewise, reverse-constructive alignment leads to authentic assessments that simulate real-world disciplinary skills. This is particularly beneficial for learners, as they can better appreciate the knowledge and relate it to its practical application in the industry. This is predominantly valuable for engineering education, as the cognitive and psychomotor skill sets are essential for carrying out tasks safely and efficiently.

Most concerns about AI-integrated learning revolve around the trust and reliability of the systems. Hence, putting effort into constructing an assessment that is fit for purpose will result in improved trustworthiness and create coherent learning. By designing the assessment first, this could potentially reduce the impact of AI's complex 'Blackbox' situation. This will enhance responsibility and transparency, allowing learners to make informed decisions. Besides, it will reduce the potential for errors and increase confidence in using AI as an assistive tool in their learning process. Recognising AI as an assistive tool ensures learners are aware of the ethical implications and the potential risks associated with back-end issues, such as hallucinations or inaccurate results. These will encourage learners to gain a better understanding of the engineering theories that underpin the entire process.

However, by doing reverse engineering, there is also a risk of misalignment with the institutional frameworks that typically map learners' attainment to specified learning outcomes. Additionally, starting with designing an assessment may lead to a narrowing of learning, focusing on teaching to test. These concerns can be part of the consideration when planning the assessment and reviewed constructively to ensure an effective teaching and learning process.

#### 4. CONCLUSION

In conclusion, by offering individualised, process-oriented feedback and fostering critical analysis of AI outputs, assessment has the potential to advance learner agency. Assessment was identified as key element in the constructive alignment cycle that regards learners' contribution aligning

the pedagogical teaching and learning process. To reduce significant risks during the process, AI integration in assessment must be carefully planned and executed. The dangers of this scenario include over-reliance, depersonalisation, standardisation, lack of transparency, and algorithmic bias. These will result in the degradation of learner's human agency and independent thought. Achieving a "human-machine symbiosis" where AI enhances rather than replaces human abilities is crucial to developing learner agency.

Educators can gain a deeper understanding of how AI impacts learners' agentic engagement by evaluating suggested findings. This knowledge will enable them to create AI-driven interventions that empower students rather than restrict their autonomy. The interaction between AI and human have the capabilities to evaluate agentic levels. AI has a potential to enhance rather than reduce human agency. Looking into "agency" in the context of how AI can help with assessment and balancing between human oversight are necessary to further appreciate its effects.

There is a lack of detailed empirical studies on the long-term effects of AI on academic performance, self-regulation and learning behaviours. Therefore, continuous research and evaluation are essential. A refresh assessment approach for AIED that goes beyond conventional methods should be investigated in future studies.

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