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DEPARTMENT OF EDUCATION, COMMUNICATION &
LEARNING

FEEDBACK IN THE ERA OF GENERATIVE AI

An Explorative Focus Group Study of Student and
Educator Perspectives in Higher Education

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Examiner:	Géraldine Fauville
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Abstract

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Keywords: AI-generated Feedback, ChatGPT, Dialogic Feedback, Dialogism
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Purpose: The purpose of this study is to investigate the perception of students and educators in higher education towards feedback provided by large-language model AI, with feedback and interaction with human educators.

Theory: Drawing on the dialogism framework and considering the emotional and relational aspects of feedback, this study examines the role of dialogue and interaction in feedback processes and the implications of integrating AI-generated feedback with human feedback.

Method: Adopting a qualitative research methodology, the study encompassed focus group interviews with 17 university students and nine educators across two esteemed Swedish universities. The gathered data was dissected via thematic analysis, spotting themes that resonate with the participants' experiences and views on feedback with generative AI and human instances.

Results: The analysis revealed three main themes, highlighting various aspects of feedback in the context of using generative AI tools such as ChatGPT alongside human educators. These themes emphasised the importance of understanding the nature of generative AI and human feedback, addressing the emotional dimensions of feedback, recognising potential risks and ethical concerns of using generative feedback, and exploring the integration of AI-generated feedback with human feedback practices to enhance learning engagement and outcomes. The findings contribute to the understanding of the potential and risks of AI-generated feedback in higher education and inform the development of best practices for integrating AI and human feedback ethically.

Foreword

First and foremost, my deepest sense of gratitude is extended towards my supervisor, Oskar Lindwall. His generous support and cooperation throughout the long-term project, including the internship and authoring of this master's thesis, were nothing short of a beacon, illuminating my career path towards pursuing a doctoral degree and a future career in academia. Oskar's profound humanity and his consistently encouraging feedback on 'feedback', steeped in depth and insight, became the lifeblood of this writing journey.

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1. Introduction

1.1 Background

Feedback has received much attention for its transformative potential in the learning process, as evidenced by numerous literature reviews and meta-studies (e.g., Black & Wiliam, 1998; Hattie & Timperley, 2007). Feedback is indeed an integral part of the learning process and various models and diverse theories have been developed to explain how it works and how it contributes to student engagement (Lipnevich & Panadero, 2021). Recognised as an essential component of academic interaction, feedback has been shown to have a significant impact on successful teaching, learning and assessment processes (Merry et al., 2013). However, researchers in the field of feedback have noted that despite the recent expansion in feedback-related literature in higher education, coupled with substantial investment by universities, feedback comprehension and implementation remain scant among both educators and students (Carless & Boud, 2018; Dawson et al. 2019; Henderson et al. 2019).

Concurrently, interest in leveraging the potential of artificial intelligence (AI) feedback systems such as intelligent tutoring systems (ITSs) incorporating natural language processing, has been on the rise. The goal is to improve the quality, quantity and efficiency of educational feedback (Shaik et al., 2022; Wongvorachan et al., 2022). The rapidly growing literature on human-AI interaction covers a variety of areas, including conversational interfaces, transparent communication, and competent interaction design. In particular, since autumn 2022, interactive and continuous dialogue-based feedback based on large language model AI has become increasingly feasible through the rapid development of advanced language models such as ChatGPT (Generative Pre-trained Transformer), BERT (Bidirectional Encoder Representations from Transformers), and other generative AIs. ChatGPT has attracted significant attention with 100 million users as of January 2023, within two months of its launch, as the fastest user expansion service in human history, according to The Guardian (2023). This trend has opened up new avenues for personalised learning experiences, with the potential to adapt to individual learner needs and promote a deeper understanding of complex concepts.

However, research exploring the interplay between generative AI and human perceptions, specifically within an educational context, is still nascent despite the rapid pace of development and attention that generative AI technologies are receiving. This can be starkly observed by inconsistent responses around the world as generative AI has been initialised to deploy in higher education. UNESCO published '*ChatGPT and Artificial Intelligence in Higher Education - Quick Start Guide*' in April 2023. The report brings up the main concern with generative AI such as ChatGPT in higher education from research about 'academic integrity' (Sabzalieva & Valentini, 2023, p. 11). Yet by Spring 2023, many higher education institutions were still struggling to manage their correspondence to direct such technology. This struggle was exemplified by an incident at Uppsala University in Sweden, where a student was disciplined for cheating, having exploited ChatGPT (Uppsala University, 2023). Adding to this global discord, Italy became the first EU nation to prohibit ChatGPT in April 2023, as reported by the BBC, expressing concerns over potential privacy breaches (McCallum, 2023). In contrast, in Japan, as of May 2023, the University of Tokyo has steered the course towards allowing the use of generative AI in education for students and teachers. The university expected students and faculty to actively find good uses, new technologies, new legal systems and social and economic systems in order to find a direction on how their use can avoid problems (University of Tokyo, 2023).

Whereas the promise of AI-driven feedback, it is significant to recognise that feedback, advice, and similar social dialogue-based actions between humans are inherently complex and sensitive (Sutton, 2012; Lindwall et al., 2022). The claim that generative AI has 'dialogue systems' (OpenAI, 2023) and the accompanying interactive feedback needs to be carefully explored under an epistemological and theoretical framework. It is of paramount importance to explore the perspectives of both students and

educators on feedback, as understanding the challenges faced by both parties is crucial for examining effective feedback processes in higher education (Boud & Molloy 2013b; Henderson et al., 2019; Alharbi, 2022). Therefore, while acknowledging the conceptualisation of feedback by Hattie and Timperley (2007) which builds the conceptualisation of feedback, this study aligns with a more socially and relationally oriented research stream, which takes as its source dialogism (Bakhtin, 1934-35, 1981; Linell, 1998; 2007; 2009). Dialogism offers its epistemological and theoretical foundation to examine the perspectives of students and educators, who are crucial stakeholders of feedback in higher education. As generative AI systems permeate educational settings, it is significant that they are designed to provide dialogic feedback while appropriately reflecting the perceptions of the parties involved in order to truly support learners' growth and development.

1.2 Purpose and Aims

The purpose of this study is to examine how students and educators in higher education view and discuss feedback generated by large-language scale generative AI, particularly in comparison to feedback given by human educators. Specifically, this study aims to address the following research query:

RQ: How do students and educators perceive and interpret the feedback generated by large-language scale generative AI systems in relation to human-provided feedback in higher education?

To address the research question, this study conducts focus groups with university students and educators to elicit their perspectives and experiences of both generative AI and human feedback. The problem lies in the nascent field of generated AI-driven feedback systems in education, specifically in exploring how students and educators perceive and understand feedback from large-language model AI systems in comparison to human-provided feedback. The lack of in-depth exploration into this area, particularly in terms of the emotional dimensions, risks, and ethical concerns, constitutes the main issue. This research provides institutions, policymakers, educators and learners who are considering the use and risks of using generative AI in higher education with a voice and perspective based on the experiences of those involved with generative AI (particularly ChatGPT) and human feedback from a social-constructional view based on dialogism. The findings of this research will contribute to the understanding of the potential and risks of AI-generated feedback in higher education and inform the development of best practices with the integration of AI and human dialogic feedback.

1.3 Overview of the Thesis Work

The thesis is divided into eight sections. Following the first part of the introduction, the second part is a literature review: feedback in higher education, the conceptualisation of feedback, AI in education including generative AI and issues of trust. The third part acknowledges theoretical foundations: dialogism and dialogic feedback. The fourth part presents the methodology: research participants, data collection, data analysis and ethical considerations. In the fifth part, the results of the study are shared with the perspectives of educators and students on each of the three themes. The sixth part, based on results, discusses the possibilities and limitations of generative AI and ethical issues in the context of prior literature and theoretical foundations. The seventh part contains conclusions and implications for educational parties. The eighth part depicts the limitations of this study and future recommendations.

2. Literature Review

The literature review encompasses the discussion of feedback in higher education, the conceptualisation of feedback, the evolution of AI in education, the advent of large language models AI, and the issues of trust in AI context. Feedback in higher education has been explored from behaviour-focused to learner-centred pedagogies, underlining the need for dialogue in the feedback process. Research into feedback models reveals shared objectives but significant differences in aims. Hattie and Timperley's (2007) feedback model uses four feedback levels and a strategy of feed up, feed back, and feed forward to improve learning outcomes. AI in education has been investigated as a potential tool to enhance teaching and learning since the 1950s, with its integration promising personalised instruction and enriched teaching techniques. Intelligent Tutoring Systems (ITSs) have been a notable development, but their effectiveness is challenged by their tutor-centred approach, limiting dialogue and self-regulated learning. Recent developments such as GPT and BERT have introduced the possibility of AI-generated feedback in education, though their adoption is discussed with technical and ethical challenges. Trust is pivotal in this scenario, with competence and communication trust being key determinants of the acceptability of AI tools. Trust in teacher-student relationships also significantly impacts the reception of feedback. This intersection of AI, feedback, and trust in education underscores the need for further investigation and careful implementation.

2.1 Feedback in Higher Education

Feedback has been increasingly recognised as an important aspect of higher education (HE), as it is believed to stimulate students' engagement with their subject knowledge and develop their ability to evaluate their own and their peers' work (Boud & Molloy, 2013a; Evans, 2013; Sadler, 2010). Within the wider context of advances in pedagogical approaches to supporting learning in HE, feedback has received much attention for its transformative potential in the learning process, as evidenced by numerous literature reviews and meta-studies (e.g., Black & Wiliam, 1998; Hattie & Timperley, 2007). Recognised as an essential component of academic interaction, feedback has been shown to have a significant impact on successful teaching, learning and assessment processes (Merry et al., 2013).

The discussion of the emergence of feedback in HE can be traced back to behavioural approaches, which assumed that individuals could be influenced by feedback without conscious participation (Boud & Molloy, 2013a). However, over the past decades, the HE landscape has gradually shifted towards more learner-centred pedagogies (Hannafin & Land, 2000; Kember, 2009; Wood, 2021) with constructivist epistemology (Biggs, 1996; Lea et al., 2003), and diverse and sustained assessment methods (Boud, 2000; Sadler, 1989). Consequently, Boud and Molloy (2013b) emphasised the importance of a dialogue process to enable students to understand and use feedback information, a view supported by other researchers (Carless et al., 2011; Price et al., 2011).

The capacity of feedback to foster successful student learning has been comprehensively delineated by multiple scholars, such as Black and Wiliam (1998), Hattie and Timperley (2007), and Shute (2008). Esterhazy (2019) highlights three major strands in higher education feedback literature: 1) effectiveness of various feedback interventions, 2) perceptions of feedback from both students and educators, and 3) engagement with feedback, focusing on how it is generated and utilised in practice.

The first strand of literature regarding feedback within HE investigates the efficacy of diverse feedback interventions. Cartney (2010) underscores the value of not only acknowledging cognitive facets of peer learning, but also understanding its emotional dimensions, proposing that a transformation in programme culture may be necessary to optimise the utility of peer assessment. Ion et al. (2018) articulate how feedback assisted their learning advancement, suggesting that students are keen to take a proactive stance in their learning journey, viewing their involvement as crucial in shaping the pedagogical experiences. To optimise the benefits, the authors argue feedback must be supplemented with personal guidance and mentorship to strengthen the task correlation, dispel any

uncertainties, and illuminate the remarks received. On the other hand, Jones and Gorra (2013) report that the evidence indicates the practice of offering comprehensive feedback on summative work to all students is not an efficient use of resources for both academic personnel and institutions, given the scarce number of students both requesting and actually utilising detailed individual feedback.

The second strand of literature on feedback in HE examines the viewpoints of both students and educators, revealing intriguing insights into the varying ways these two parties interpret and conceptualise feedback. Adcroft (2011) postulates that these distinct groups form their unique narratives of feedback, which then shape their beliefs, attitudes, and behaviours within the feedback cycle. According to the collected data, there is a discrepancy between how academics and students perceive feedback, leading to a discord as the two groups interpret the same feedback scenarios in disparate ways (Adcroft, 2011). Carless (2006) delineates several contrasting perceptions held by students and tutors regarding the assessment, grading, and feedback process. The author proposes that 'assessment dialogues' serve as a progressive means to alleviate some of the mistrust or misunderstandings that may inadvertently arise from the evaluation process. Dawson et al. (2019) present a qualitative exploration of the perspectives held by educators and students on the purpose of feedback, as well as their criteria for effective feedback. An inductive thematic analysis reveals that both staff and students predominantly consider improvement as the principal purpose of feedback. They found that students and educators continue to associate the role of feedback predominantly with the provision of comments, often linked with somewhat ambiguous ideas about its potential for facilitating improvement. They argue such beliefs place too much emphasis on having a definitive understanding of what constitutes quality input or the provision of information (Dawson et al., 2019). Contrarily, it suggests that feedback should be evaluated based on how students utilise the information related to their work and the subsequent demonstrable enhancements in their work and learning strategies (Dawson et al., 2019). Nevertheless, students and educators may have different perspectives on what constitutes effective feedback (Adcroft, 2011; Dawson et al., 2019), which may contribute to ambiguous findings in this area of research (Esterhazy, 2019).

The third strand of interest in this area is the burgeoning research focused on the engagement with feedback, more specifically, the processes through which feedback is created and utilised (Winstone et al., 2017). Vehviläinen (2009) offers an insight into the interactive dynamics of a feedback scenario wherein the educator endeavours to fundamentally alter the student's approach to their thesis. In this situation, the expectation is for the student to not only acknowledge the feedback but also comprehend it. This would represent a transition from a product-oriented supervision style to a more process-oriented one, where the mutual focus extends beyond the text, its flaws, or developments, and includes the manner in which the student engages with the work (Vehviläinen, 2009). Ajjawi and Boud (2017) illustrate a learner integrating learning and feedback dialogue within his professional tasks beyond the confines of the course. This allows for the exploration of the interplay between materials, tutor actions, student actions, and the context. Their example illuminates how the space for feedback dialogue can act as a conduit for learning, distributed across individuals, time, and space, and also underscores the value of pedagogical design in bolstering feedback dialogue (Ajjawi & Boud, 2017). Alharbi (2022) investigates students' attitudes towards various feedback modalities coupled with text revisions. The findings suggest that the extent and quality of students' integration of teacher feedback fluctuated across the four modes, with audio-visual feedback seeing the highest degree of integration in text revisions, whereas text feedback experienced the least integration.

In exploring feedback perceptions in HE, recent studies have started arguing that solely focusing on how feedback is utilised to 'transmit' information limits the understanding of the processes and relationships that enable students to truly engage with the information (Esterhazy, 2019). Furthermore, on the topic of conceptual methods, it has been observed that only a few of the aforementioned studies provided a lucid definition of 'feedback', thus causing a certain ambiguity in the theoretical underpinnings of the literature (Esterhazy, 2019).

Feedback plays a central role in providing students with information about their performance and progress in academic interaction (Morton et al., 2014). Furthermore, feedback is seen as a form of scaffolding that ultimately encourages students to take greater responsibility for their work and to develop as legitimate authors in their field (Morton et al., 2014). Feedback can come from a variety of sources, including peers, self-assessments and academic educators. Although feedback is intuitive and influential, educators use a range of strategies to engage in this process, increasing the importance of raising awareness of the concept of feedback, including feedback literacy for both academics and students (Gravett et al., 2020). Sutton (2012) brought the concept of feedback literacy to the forefront within the context of academic literacies, describing it as the skill to comprehend, interpret, and apply written feedback. Carless and Boud (2018) further expanded on this notion, defining student feedback literacy as ‘the understandings, capacities and dispositions needed to make sense of information and use it to enhance work or learning strategies’ (p. 1316). Feedback literacy empowers students to interact efficiently with feedback and it boosts the feedback process' quality, as feedback is most effective when understood and implemented. The quality of feedback provided by educators is also critical in influencing the motivation, engagement, and achievement of students. Several studies have highlighted the importance of feedback in academic interaction, with some scholars arguing that feedback can be the most powerful tool for improving student performance (Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006). However, providing high-quality and timely feedback can be challenging for educators, given the large number of students they are responsible for (Deeva et al., 2021).

Today's universities as institutions of higher education bear the responsibility of not only equipping students with the necessary competence in their respective fields of knowledge but also fostering the skills required to navigate the intricate and rapidly evolving dynamics among individuals, knowledge resources, tools, and learning spaces characteristic of the contemporary world (Damşa & Jornet, 2016; Esterhazy, 2019). Disciplines within HE are often perceived as intricate networks of diverse social practices and discourses, moulding the social interactions within which pedagogical processes transpire (Trowler et al., 2012). As knowledge is of pivotal importance to HE, the entrenched knowledge and collective epistemic approaches constitute the core organisational principles within various disciplines and their practices (Becher & Trowler, 2001; Markauskaite & Goodyear, 2017). Inherent to the essence of instruction and teaching, the majority of social interactions during HE courses are typically pre-planned by educators (Esterhazy, 2019). These findings lend further weight to previous research that contends that the rapport between students and teachers plays a crucial role in nurturing fruitful feedback dialogues (Esterhazy, 2019; Price et al., 2013; Yang & Carless, 2013). Henderson et al. (2019) argue that in order to enhance feedback, it is crucial to understand the experiences of the involved parties, bearing in mind that feedback is intrinsically socially constructed and contextually situated (Ajjawi & Boud 2017).

2.2 Conceptualisation of Feedback

Numerous researchers have dedicated their efforts to constructing models and theories that shed light on the workings of feedback and the factors influencing student engagement with it. In their comprehensive investigation, Lipnevich and Panadero (2021) examined and compared prominent feedback models and theories. Their findings reveal that while these models share a common objective of unravelling the feedback process and its effects, their specific aims and objectives diverge significantly. The authors also noted the current lack of organisation in this field, as uncertainty persists regarding the available feedback models and their optimal application in educational activities, assessments, and interventions. To address this issue, Lipnevich and Panadero (2021) propose that feedback researchers align their work more closely with their individual objectives. They suggest that pedagogical models could prove more valuable when the focus is on educational interventions. Such models offer broader applicability and are easier for educators to implement across different instructional contexts. Hattie and Timperley's (2007) work serves as an example of a pedagogical model that exemplifies these characteristics. Within the realm of pedagogical models, the feedback

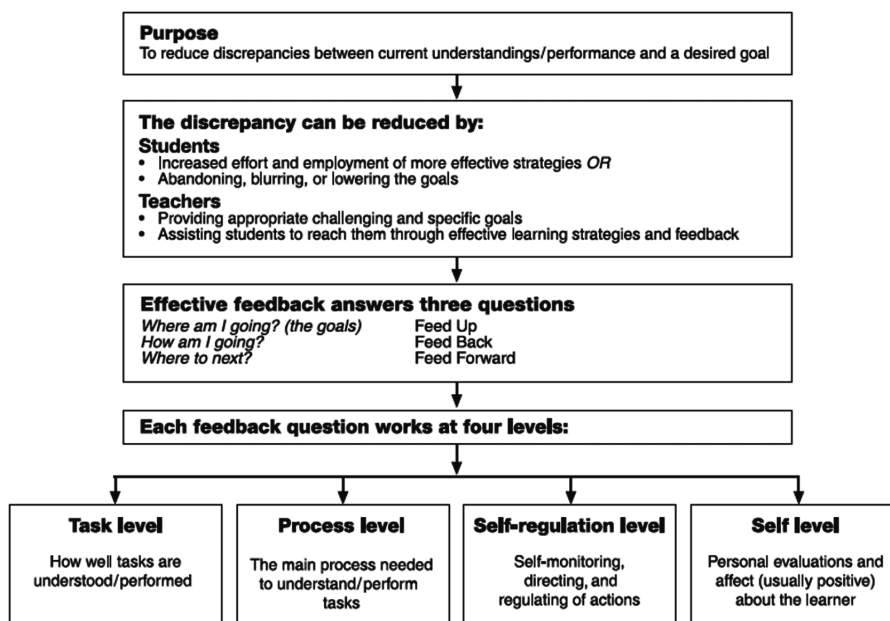
model presented by Hattie and Timperley (2007) has made a significant impact, as highlighted by Panadero and Lipnevich (2022). This model distinguishes itself through a substantial body of empirical evidence supporting its validity, setting it apart from other existing models.

According to Hattie and Timperley (2007), feedback can be defined as 'information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding' (2007, p. 81). Feedback can take many forms, including verbal comments, written comments, grades or scores, and nonverbal cues such as facial expressions. By providing students with specific information about their performance and understanding, teachers can help students develop a sense of self-awareness and self-efficacy. This, in turn, can lead to improved learning outcomes. This concept has been taken over to more learner-centred conceptualisation as a process 'whereby learners obtain information about their work in order to appreciate the similarities and differences between the appropriate standards for any given work, and the qualities of the work itself, in order to generate improved work' (Boud & Molloy, 2013a, p. 6).

Hattie and Timperley (2007) acknowledge '[f]eedback is one of the most powerful influences on learning and achievement' (p. 81). However, the type of feedback provided and the way it is given can be differentially effective. Hattie and Timperley's (2007) framework of feed up, feed back, and feed forward also outlines a strategic approach to student feedback. It addresses three core questions for both teachers and students: the direction of learning (feed up), current progress (feed back), and next steps (feed forward). Feed up establishes clear goals and expectations, guiding students on their learning path. Feedback assesses progress, acknowledging strengths and identifying areas for improvement. Feed forward offers specific strategies for enhancing learning outcomes.

Figure 1

Feedback model (Hattie & Timperley, 2007)



Hattie and Timperley (2007) also distinguish four different levels of feedback:

1. Task-level feedback: This level of feedback is focused on the task or product itself. It may include comments on whether the work is correct or incorrect and directions for acquiring more information.

2. Process-level feedback: This level of feedback is focused on the process used to create a product or complete a task. It may include comments on how information was processed and suggestions for improving learning processes.

3. Self-regulatory level feedback: This level of feedback is focused on the student as an individual. It may include comments on strengths, weaknesses, and areas for improvement.

4. Self-level feedback: This level of feedback is focused on helping students develop self-awareness and self-efficacy. It may include comments that are personalised and specific to each student.

In addition to the four levels of feedback and feed up, feed back and feed forward outlines, other factors such as the timing and frequency of feedback, the quality of the relationship between the teacher and student, and the student's prior knowledge and motivation can also impact the effectiveness of feedback. Hattie and Timperley (2007) states that 'Feedback should cause thinking; it should be focused on what can be done next; it should be timely; and it should be given in a way that helps learners close the gap between where they are now and where they need to be' (p. 87). Their conceptualisation of feedback and the concept of the four levels of feedback provides a theoretical foundation for understanding how different types of feedback can be used to improve learning outcomes. According to the author, educators can provide targeted, specific, and effective feedback that helps students develop self-awareness and self-efficacy. Additionally, by using a formative assessment approach and considering other factors such as timing and frequency of feedback, teachers can ensure that their feedback is maximally effective in improving student learning outcomes.

Moreover, the distinction between lower order concerns and higher-order concerns is relevant to providing feedback in higher education and especially the four levels of feedback as a concept. According to Reigstad and McAndrew (1984), lower-order concern and higher-order concern is an important principle in writing supervision. Lower-order concerns refer to issues such as grammar, spelling, and punctuation, which are important for clarity and correctness but do not necessarily affect the overall quality of the piece. Higher-order concerns, on the other hand, refer to more significant issues such as organisation, argumentation, and evidence. These are the elements that make a piece of writing effective and persuasive. Reigstad and McAndrew (1984) emphasise that when supervising a student's output, it is important to focus first on addressing any high-order concerns before moving on to lower-order concerns. This is because high-order concerns have a greater impact on the overall quality of the piece and can significantly improve its effectiveness. By prioritising high-order concerns in feedback on students, educators can help students develop stronger writing skills and produce more effective pieces of writing. This approach also helps students understand the importance of focusing on higher-order concerns when revising their own work.

2.3 AI in Education

The discussions of AI in education have a long history from the 1950s, with numerous studies investigating its potential to augment the learning and teaching experience (Beck et al., 1996; Popenici et al., 2017; Zhai et al., 2021). Over the past quarter of a century, AI in education has made remarkable progress (Roll & Wylie, 2016), driven by advances in computing and information processing. These developments have created new opportunities and challenges for educational practice (Ouyang & Jiao, 2021). AI in education aims to enhance teaching techniques through real-world applications, modular prototypes, and learning analytics (Alam, 2021), with the main goal of providing personalised guidance to individual learners (Hwang, 2014; Hwang et al., 2020). AI directs to facilitate the teaching process, where teacher acceptance is critical (Limna et al., 2022).

Since the advent of computers, researchers have sought to create computer-based tutors that are as effective as their human counterparts (Smith & Sherwood, 1976). ITSs integrate AI techniques to develop computer programs that have knowledge of the subject matter, learners and effective teaching methods (Elsom-Cook, 1987). The design of ITSs combines elements of computer science, cognitive

psychology and educational research, often referred to as cognitive science (Nwana, 1990). ITS has its roots in cognitive science, and combines insights from computer science, cognitive psychology and educational research. With advancements in those fields, ITSs' design has evolved, leading to the creation of two categories of computer-based instruction as distinguished by VanLehn (2011). The first, Computer-Assisted Instruction, provides immediate feedback and hints on student responses, such as solving a quadratic equation and receiving praise or prompts to try again. In the second category, ITSs emphasise natural language dialogue and interactive interfaces, allowing students to enter problem-solving steps, choose methods and interact with intelligent agents. ITSs provide feedback on each step, resulting in a more holistic learning experience. ITS research is inherently multidisciplinary, with a focus on developing student models (Desmarais & Baker, 2012) that digitise learners' abilities and facilitate personalised instruction tailored to their aptitude (Conati & Kardan, 2013; Graesser et al., 2018; Steenbergen-Hu & Cooper, 2014; Vandewaetere et al., 2011).

Despite their development, ITSs have been facing several challenges, including limited mixed-initiative dialogue and support for self-regulated learning. These systems may not address all questions, topics or tasks raised by students unless pre-programmed, resulting in an instruction- or tutor-centred rather than student-centred learning experience (Graesser et al., 2018). Furthermore, the traditional knowledge transfer approach in ITSs typically overlooks alternative learning science approaches such as collaborative learning, guided discovery learning, and productive failure (Dean Jr. & Kuhn, 2007; Miao et al., 2021). Historically, AI in education has focused on individual students working with computers in maths or science classrooms to solve step-based problems (VanLehn, 2006). However, this approach does not take into account contemporary developments in education, such as the emphasis on 21st-century skills (Trilling & Fadel, 2009) and the Next Generation Science Standards (NGSS, 2013), which prioritise metacognition, critical thinking and collaboration. Although the development of AI possesses the potential to revolutionise the educational sector (Deeva et al., 2021; Holmes et al., 2019), achieving desirable educational results is not solely dependent on just utilising sophisticated AI computing technologies (Castaneda & Selwyn, 2018; Du Boulay, 2000; Selwyn, 2016). It is imperative to note that the application of varying classes of educational technologies typically suggests divergent philosophical and pedagogical perspectives, which have a substantial impact on the quality of both learning and teaching (Hwang et al., 2020). To remain relevant and impactful, researchers argue that AI in education must adapt to these changes and seize opportunities for increased agency and personalisation (Collins & Halverson, 2010; Roll & Wylie, 2016).

Ouyang and Jiao (2021) outline three paradigms of AI in education: 1) AI-directed, learner-as-recipient, where AI represents and directs cognitive learning and learners receive AI services; 2) AI-supported, learner-as-collaborator, where AI supports learning and learners collaborate with AI; and 3) AI-empowered, learner-as-leader, where AI empowers learning and learners take charge of their learning process. Chen et al., (2020) suggest that the AI system ideally would foster imagination and creativity, analyse learning styles and emotional states, and encourage learner initiative while stimulating personal career growth. However, only a handful of studies have explicitly delved into the distinct roles AI might play in the educational sphere, the manner in which AI interacts with extant educational and learning theories, and the degree to which AI technologies may influence the process of learning and instruction (Hwang et al., 2020; Ouyang and Jiao; 2021).

2.4 Generative AI - Large Language Models

AI-generated feedback systems use natural language processing algorithms to analyse student work and provide feedback based on predefined criteria (Clarizia et al., 2018). These systems can provide feedback on different aspects of student work, including grammar, syntax and content. AI-generated feedback systems have several potential advantages over human feedback, including the ability to provide personalised feedback quickly and consistently (Baidoo-Anu & Owusu, 2023). The advent of large-scale language models such as GPT and BERT has sparked interest in the potential of

AI-generated feedback systems to improve both the quality and quantity of feedback in education and learning. Using natural language processing algorithms, these systems analyse student work and provide feedback based on predefined criteria, covering aspects such as grammar, syntax and content (Clarizia et al., 2018). AI-generated feedback offers several advantages over human feedback, including speed and consistency, and can contribute to the development of students' feedback literacy (Tubino & Adachi, 2022).

OpenAI's GPT, first released in 2018, marked a significant milestone in natural language processing, generating human-like text and assisting with tasks such as translation and summarisation. Subsequent iterations, GPT-2 and GPT-3, offered more advanced capabilities, expanding the possibilities for research and industrial applications (Kasneci et al., 2023). In the same year, Google Research introduced BERT, a model based on a transformer architecture and pre-trained on large text datasets for masked language modelling and next sentence prediction, learning the broader context of words across different topics (Kasneci et al., 2023). With the launch of ChatGPT in November 2022, OpenAI has attracted millions of users, investors and scientists who see it as a potential replacement for humans in the future. The groundbreaking user interface allows the public to experiment directly with the bot. Since its launch, ChatGPT has been tested in a natural conversational format across multiple domains and industries. Applications range from education and training to entertainment, question anticipation, appointment scheduling and code debugging (Arif et al., 2023). In March 2023, the field was further advanced with the release of GPT-4, which outperformed previous large language models and most state-of-the-art systems on traditional NLP benchmarks, often without benchmark-specific training or hand engineering. GPT-4 not only demonstrates superior performance in English, but also strong results in other languages (OpenAI, 2023).

However, due to dilemmas such as the impenetrability of AI algorithms, data bias and privacy leaks, the application of AI in education may face difficulties and obstacles at technical, efficacy, legal, ethical and systemic levels (Xu, 2020). AI-generated feedback systems may have limitations, including the inability to replicate the nuance and complexity of human feedback. According to Kasneci et al. (2023), large-scale language models can perpetuate and amplify existing prejudices and inequities in society, which can have a negative impact on teaching and learning processes and outcomes. Zhai (2022) also reports that bias, privacy and lack of transparency in generative AI for education could be ethical concerns. Hallucination, the production of inaccurate or logically incorrect text that appears believable and grammatically sound, is a recognized concern in LLMs (Ahs, 2023; Open AI, 2023). Ahs (2023) claims this could result in perplexity or dissemination of false information for learners and presents a difficulty for employing LLMs as an educational tool. Mhlanga (2023) insists that it is essential to conduct an in-depth analysis and address the potential for discrimination and bias before introducing generative AI systems such as ChatGPT into education. UNESCO has identified ethical concerns for higher education to issues such as academic integrity, lack of regulation, privacy concerns, cognitive bias, gender and diversity, accessibility, commercialisation (Sabzalieva & Valentini, 2023). Key concerns include potential breaches of academic integrity as students might misuse the generative AI for plagiarism or cheating. Regulatory oversight is lacking for ChatGPT, leading with over 1,000 academics and industry leaders to call for a halt to development of powerful AI until shared protocols can be established. Privacy issues have led to ChatGPT being blocked in some countries due to concerns about data collection and storage. Furthermore, the AI's inability to differentiate truth from falsehood can result in the perpetuation of cognitive biases present in its training data. Additionally, accessibility disparities arise from governmental restrictions and uneven global internet availability. Commercialisation of ChatGPT by OpenAI also raises questions about data extraction for commercial use and accessibility of non-open source tools (Sabzalieva & Valentini, 2023).

Despite those challenges, the realm of AI-driven conversation facilitators is expanding at a rapid pace today. There are numerous examples of these agents demonstrating their capabilities in bolstering online teaching and learning conversations, either substituting for an actual tutor or participants (see

studies such as Graesser et al., 2017; Tegos, et al., 2016). This trend is anticipated to be a burgeoning field in dialogic research, propelled further by improvements in natural language processing (Trausan-Matu et al., 2021). On the other hand, human feedback is not just about providing information about the technical aspects of students' work, but also about providing personalised and contextualised feedback that takes into account students' individual needs and preferences. Leite and Blanco (2020) found that the group that received human feedback outperformed the AI's automatic feedback, suggesting that it may have helped students' conceptual understanding. Compared to the research exploring the impact of AI-based feedback on teaching and learning, little research has examined students' (and teachers') perceptions of this AI feedback (Calvo & Ellis, 2010). It is significant to explore how students and educators in higher education perceive feedback from rapidly changing generative AI technologies and human feedback.

2.5 Trust in AI

Trust, a crucial factor across various disciplines such as sociology, management, organisational theory, and education, lacks sufficient discussion in relation to teaching, learning, and evaluation in higher education (Carless, 2012). Besides, numerous elements contribute to human trust in AI technology. These involve the system's tangibility, transparency, reliability, and promptness, along with the task's context and the degree of machine intelligence (Glikson & Woolley, 2020). Competence trust or 'trust in capability', which refers to an individual's efficiency and effectiveness in executing a task, is a crucial aspect of trust (Reina & Reine, 2009; Carless, 2012). Primarily, competence trust is a driver for another key attribute: communication trust. This is the belief that a conversation partner is sharing information openly and genuinely cares about one's best interests (Carless, 2012). According to Ivarsson and Lindwall (2023), as conversational agents evolve, distinguishing between human and artificial communication becomes increasingly challenging. This underlines the importance of comprehension as a recurring focus in real-world human-computer interactions. The authors propose that capabilities of comprehension are integral for fostering trust between humans and conversational agents (2023).

Trust also plays a key role in teacher-student relationships, as it sets the stage for a transformative, dialogic learning environment (Curzon-Hobson, 2002). However, a phenomenon known as 'faking good' (Gibbs, 2006, p. 26) can occur, where students portray themselves as more knowledgeable than they truly are. This behaviour arises from the fear of exposing their weaknesses or attempting challenging tasks that may risk lower grades or damage their self-esteem (Gibbs, 2006; Carless, 2012). Dialogue can be most beneficial when students feel secure enough to be transparent about their partial understandings and don't hide their lack of knowledge or mistakes (Carless, 2012). The relational aspect also influences a student's reaction to feedback, particularly their perception of the tutor providing the feedback (Orsmond et al., 2005). In the context of feedback, students require high-quality input from reliable and competent sources, complemented by less refined feedback from peers (Carless, 2012).

The discourse on trust and suspicion, Ivarsson and Lindwall (2023) take into consideration Porcheron et al.'s (2018) cautionary advice against the anthropomorphisation of conversational technologies. Button et al. (2022) build upon Winch's (1990) work, arguing that employing natural language phrases can potentially lead to confusion, as these words' common uses are still prevalent. In the widespread use of conversational AI, there exists a potential for conceptual blurring. Consequently, researchers and developers might incorrectly interpret interactions with the interface as genuine conversations (Ivarsson & Lindwall, 2023). Therefore, Ivarsson and Lindwall (2023) propose viewing the concept of trust as a fundamental order—a prerequisite condition rather than an outcome of action, which lies at the heart of the concept as outlined by Garfinkel (1963).

3. Theoretical Framework

The theoretical framework in this research applies to dialogism, based on Mikhail Bakhtin (1895-1975)'s work, is an epistemological framework focusing on inclusive meaning-making through language and cognition in diverse contexts, influenced by social and cultural elements. It emphasises the importance of contextual interaction and dialogue for learning. Dialogic feedback, derived from this framework as a theory, emphasises interaction, emotions, and dialogue, fostering reciprocal communication between teachers and students, thereby improving learning outcomes and critical thinking skills.

3.1 Dialogism as Epistemology

Dialogism, as an epistemological framework, focuses on a vast area of human action, cognition, and communication (Linell, 2007). It is founded on the premises of Bakhtin, a Russian literary scholar, and the theoretical perspective was then significantly developed with the writings of members of the Bakhtin Circle (Brandist, 2002; Skidmore, 2019). In Bakhtin's work, meaning-making is an inclusive process, integrating multiple perspectives and voices. From *Discourse in the Novel* (1934-35, 1981), dialogism is 'the characteristic epistemological mode of a world dominated by heteroglossia' (p. 426). This dialogic imperative, mandated by the pre-existence of the language world relative to any of its current inhabitants, ensures that there can be no actual monologue. In other words, dialogism is the idea that all language is inherently dialogical and that there can be no true monologue because every utterance is influenced by other meanings and has the potential to influence others in turn (Bakhtin, 1934-35, 1981).

A key facet of dialogism is the recognition of context and situational features' influence on communication and cognition (Linell, 1998; 2007). Dialogism appreciates that the same message can yield different meanings and interpretations in diverse contexts. Thus, the importance of comprehending the context of communication is emphasised. Similarly, it asserts that language usage is shaped by social and cultural elements, reflecting societal norms, values, and power dynamics. Dialogism illustrates the human being as having a 'social mind' (Linell, 2009; Valsiner & van der Veer, 2000). Linell (2009) underscores the point that no human being is self-sustaining entities; instead, our existence is deeply interdependent with others. The principle extends beyond simple transmission of information from one individual to another, acknowledging the intricate interplay of meanings, intentions, and interpretations involved in communication. Consequently, dialogism stresses the need for analysing language use within its social and cultural context.

In relation to the contextualism, and with reference to Nystrand (1992), Linell (2007) considers 'double dialogicality' as the distinctive 'hall-mark' of dialogism, which implies combination of interactionism and social constructionism. Linell (2007) emphasises that dialogism requires the perspectives of both situated interaction and sociocultural practices are incorporated. In this regard, communication and cognition 'always involve interaction with others (other persons, other systems, other dimensions of one's self, others through texts and other artefacts such as computers with 'inscriptions', etc)' (Linell, 2007, p. 6; 2009). In this sense, artefacts deeply engage in human interaction; numerous aspects of human cognition and communication being heavily reliant on their presence (Linell, 2009). Meaning-making transpires through dialogue, as knowledge is distributed via interaction. Bakhtin expresses '[t]he word in language is half someone else's' in their work (1934-1935, 1981, p. 293). Vygotsky's correlation of language and thought also emphasises the connection between thinking and social experiences. Language is a primary tool individuals employ to understand the world, mediate thought and reasoning, and develop advanced mental functions (Vygotsky & Cole, 1978).

3.2 Dialogism as Theoretical Framework in Education

The foundation of dialogism has had a strong influence on the field of teaching and learning, and since the 1990s many researchers have explored the significance of ideas in education (Skidmore, 2019). Dialogism offers a theoretical framework for interdisciplinary fields such as computer-supported collaborative learning (CSCL) in learning sciences. This implies a transition where dialogism is no longer solely viewed as an epistemological or ontological framework in fields such as linguistics, literature theory, and philosophy. Instead, it is seen as a more normative model that holds value in the creation and evaluation of educational practices. According to Trausan-Matu et al., (2021) dialogism differentiates itself from social constructivism by lessening the focus on the creation of 'knowledge' perceived as an objective or tangible entity. Dialogism is not solely about knowledge creation, but it also involves engaging learners in conversation with historical voices as a crucial educational role. This also assists learners in discovering their own voice, which inherently includes engaging in dialogue with absent cultural voices (Linell, 2007: p. 223).

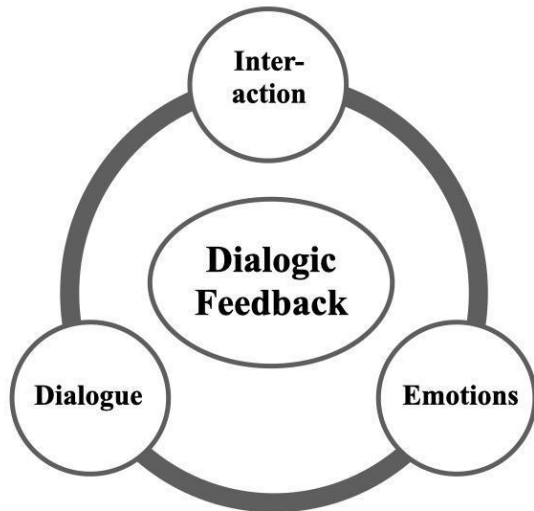
Trausan-Matu et al., (2021) mentions the term dialogic is occasionally used 'quite loosely' in educational settings and the authors interpret it more technically to associate dialogue in a sense with the concept of dialogism. In this regard, understanding is dialogic, necessitating the interplay of multiple 'voices' to make sense of things and 'voice' is employed as an extended term as understood (2021, p. 220). Trausan-Matu et al., (2021) claim that this proposition as polyphonic integration can be better understood by acknowledging that in dialogism, the meaning of anything can be perceived as a response to a question, whether stated openly or implied. The authors also state that dialogism is not solely about knowledge creation, but it also involves engaging learners in conversation with historical voices as a crucial educational role. Consequently, dialogism could be applied to educational technology and digital learning environments by providing a lens through which to examine the complex interactions that occur within these contexts (Trausan-Matu et al., 2021). The theoretical framework and essences from dialogism has been considered to enhance teaching and learning. It is particularly pertinent in the field of education, especially in the context of feedback, a crucial element of the learning process. Ensuring effective and engaging delivery of feedback to students is vital. Dialogic feedback is a long-term, reciprocal process engaging all parties, proven to enrich student engagement and satisfaction with assessment feedback (Price, et al., 2011). Trausan-Matu et al. (2021) highlight the immense challenge may present in advancing CSCL to foster the creation of a planetary intellect, capable of addressing the multifaceted global problems confronted by mankind (Lévy & Bononno, 1997). Trausan-Matu et al. (2021) acknowledge that stemming from dialogism, the dialogic education theory designed for the digital era has the capacity to surmount this hurdle. Dialogic education extends beyond the traditional goals of education to foster creativity, cultivate a multitude of perspectives, and promote boundless discussions. This kind of education lays the foundation for a potential future of dialogic democracy. (2021, p. 233)

3.2.1 Dialogic Feedback

Based on dialogism, Steen-Utheim and Wittek (2017) propose a framework for dialogic feedback in the context of learning, emphasising the importance of interaction, emotions, and dialogue in the process.

Figure 2

Framework for dialogic feedback (Steen-Utheim & Wittek, 2017)



Interaction is a crucial aspect of dialogic feedback, as it involves the active participation of both the educators and the learners (Steen-Utheim & Wittek, 2017). The authors argue that feedback should not be a one-way communication. Instead, it should foster a collaborative relationship between the participants. Emotions are often overlooked in feedback research, but play a crucial role in dialogic feedback approaches. Emotional and relational aspects of feedback are crucial in creating a positive learning environment that encourages progress (Dowden et al., 2013). Boud and Molloy (2013b) also emphasise the importance of emotions in their model of sustainable feedback. They argue that understanding students' emotional responses to feedback is significant, as it influences how feedback is interpreted and utilised. Boud and Molloy (2013b) suggest that educators should focus on building trust, promoting a growth mindset, and creating a safe learning environment to encourage a positive emotional response to feedback. Dialogue, as an essential component of the framework, refers to the ongoing conversation between the teacher and the learner (Steen-Utheim & Wittek, 2017). The authors stress the importance of engaging in a meaningful dialogue that promotes mutual understanding, encourages self-reflection, and allows for the clarification of expectations. Dialogue in the feedback process has been further explored in a study by Carless and Winstone (2023), which highlights the importance of fostering a feedback dialogue between students and educators. They argue that effective feedback should be an ongoing, iterative process that actively involves both parties, allowing for clarification, negotiation, and joint meaning-making (Carless & Winstone, 2023).

Dialogic feedback emphasises the importance of dialogue for development and reveals the emotional and relational aspects of students' sense-making in feedback processes. Steen-Utheim and Wittek (2017) argue that sense-making is inherently relational, and emotions involve perceptions of self in relation to others. The concepts of meaning-making trajectories and knowledge spaces have enriched our comprehension of student engagement with feedback, underscoring not only the epistemic and social, but also the temporal dynamics at play when students discuss and utilise feedback (Esterhazy, 2019). These concepts also contribute to recent progress towards adopting more process-oriented and dialogical feedback strategies, where students and teachers are considered as essential contributors (Boud & Molloy, 2013b; Carless et al., 2011; Price et al., 2011). Embedded in feedback interactions, emotions can influence further actions in relation to the feedback. Moreover, trustworthy relationships

between teachers and students are essential for improving students' uptake of feedback, as trust in communication and competence is built and maintained over time (Bryson & Hand, 2007; Carless, 2012).

Steen-Utheim and Wittek (2017) identified four potentialities for student learning from dialogic feedback: 1) emotional and relational support, 2) sustaining the feedback dialogue, 3) opportunities for students to express themselves, and 4) the other's contribution to individual growth. These potentialities highlight the importance of fostering a supportive environment, maintaining open communication and promoting mutual development in the feedback process. Steen-Utheim and Wittek (2017) suggest that dialogic feedback is a crucial aspect of education that can help students to develop their critical thinking skills and improve their learning outcomes. Furthermore, Skidmore (2019) observes that Bakhtin recognises that linguistic diversity is social and conceptual. For example, in school lessons, students not only learn subject-specific concepts and vocabulary (e.g., the language of mathematics and history), but also a certain order of interaction (Postic, 1986) in which the teacher controls the choice of topics and student speakers, often asking known questions and evaluating the correctness of student responses (Skidmore, 2019).

4. Method

The methodology of this study is grounded in a qualitative research approach, applying focus group interviews as the primary data collection method. While group interviews are commonly employed for efficiently gathering data from multiple individuals at once, focus groups specifically incorporate group dynamics as an integral component of the approach. The focus groups approach was selected as it provides in-depth data and enables the exploration of participants' experiences, opinions, and perspectives on the topic under investigation. Adhering to the principles of the focus group methodology, I invited the participants to exchange their ideas and experiences through the use of open-ended queries. This, however, retained elements of group interviews to a certain degree as well. The queries posed during the interviews were semi-structured and the number of participants in each group was relatively smaller than one would typically encounter in a conventional focus group, which enabled each participant to share their thoughts and opinions on a deeper level.

4.1 Research Participants

Participants for the study were recruited with opportunity sampling and snowball sampling techniques (Cohen et al., 2018) from two Swedish universities, University of Gothenburg and Chalmers University of Technology. The sample consisted of 26 participants including 17 international students and nine educators, taking part in a total of eight focus groups.

Table 1

Student Participants Information

Group	Name	Faculty	Status	Preferred Pronouns	Familiarity of Gen-AI
1	A	Education and IT	Master	she/her	2 or 3
	B	Education and IT	Master	he/him	4
	C	Education and IT	Master	she/her	4
	D	Education and IT	Master	she/her	2
2	E	Social Sciences	Master	she/her	2
	F	Education and IT	Master	she/her	3 or 4
	G	Computer Science and Engineering	Master	he/him	3
3	H	Humanities	Bachelor	she/her	2
	I	Education and IT	Master	she/her	4
	J	Infrastructure and Environmental Engineering	Master	she/her	4
	K	Infrastructure and Environmental Engineering	Master	he/him	4 or 4.5
4	L	Business, Economics and Law	Bachelor	he/him	2
	M	Business, Economics and Law	Bachelor	he/him	3
	N	Education and IT	Master	she/her	5
5	O	Humanities	Bachelor	she/her	2 or 3
	P	Chemistry and Chemical Engineering	Bachelor	he/him	2 or 3

Group	Name	Faculty	Status	Preferred Pronouns	Familiarity of Gen-AI
	Q	Education and IT	Master	she/her	4

Table 2

Educator Participants Information

Group	Name	Faculty Preferred Pronouns	Familiarity of Gen-AI
6	A	IT he/him	5
	B	IT she/her	3 or 4
	C	IT she/her	2 or 3
7	D	Education she/her	3
	E	Education she/her	3
	F	IT he/him	5
8	G	Education she/her	3
	H	Education she/her	2.5 to 3
	I	Social Sciences she/her	4.5

The student participants were five bachelor's and 12 master's students from various disciplines, with three to four students in each focus group. These students were selected to ensure a diverse representation of academic backgrounds, genders, and experience levels, but all of them had some experience of using generative AI for their study or work. Representing the international character of the educational programs, the participants were not only from Sweden, but also from Portugal, Italy, Latvia, Iran, Pakistan, China and Japan. The participants represented diverse faculties, including Education and IT; Computer Science and Engineering; Infrastructure and Environmental Engineering; Chemistry and Chemical Engineering; Social Sciences; Business, Economics and Law; and Humanities.

The educators who participated in this study were primarily professors who have experience in academic supervision of undergraduate and master's students. Certain individuals had experiences researching AI technologies pertaining to generative AI, while others were occupied with establishing protocols for generative AI in the university. Some individuals were neither involved in research nor development, but were instead utilising generative AI on a trial basis for education and tried to have dialogue with students about generative AI. The educators were all from the University of Gothenburg and they belonged to either Education, IT, or Social Sciences faculty.

The table encompasses self-assessment scores (one to five; one is minimum and five is maximum) that gauge participants' personal familiarity of generative AI systems such as ChatGPT, which were asked at the beginning of the interview. Notably, educators tended to rate themselves more conservatively compared to students. It is important to acknowledge that these ratings do not necessarily reflect their objective measure of proficiency.

4.2 Data Collection

Data collection took place between the end of March and the end of April 2023. Focus groups were chosen as a data collection method because the method offers an insight into individuals' experiences, the formation of ideas, and the development of perceptions and information based on participants' dialogues and interactions (Kitzinger 1994; 1995). Given the flexible and spontaneous characteristics of focus groups, the aim of this research was intentionally wide, allowing for dynamic conversations within the focus groups and comprehensive narratives of individual experiences and interpretations (Grow & Christopher, 2008). A strength of the focus group interview is the continuous interaction among the interviewees, overseen by a moderator who plays a crucial part in guiding and facilitating the discussion (Morgan, 1996; 2002). In focus group interviews, participants are encouraged to respond to each other's opinions and generate fresh ideas from diverse viewpoints, an aspect not feasible in either individual interviews (Kitzinger, 1995). This contributes significantly to the broader question of understanding individual perspectives (Kitzinger, 1995). The process maintained certain aspects of group interviews as the questions asked were semi-structured, and each group had fewer participants as three to four people, compared to traditional focus groups. This formulation allowed for more in-depth sharing of individual thoughts and opinions within a limited time duration.

All participants were granted informed consent before participating in the sessions. Interviews were recorded with participant's agreement, employing individual microphones and a spare omnidirectional microphone for backup to guarantee high-quality audio, aiding subsequent data analysis (Kitzinger, 1995; Crang & Cook, 2007). Light refreshments were provided during the meetings to cultivate a relaxed and comfortable environment, which could be conducive to fostering better discussions (Crang & Cook, 2007). During the interviews, the interviewer asked an icebreaker question (how familiar are you with generative AI, on a five-point scale and interest towards them) to initiate the conversation and create a comfortable atmosphere for the participants before discussion. The focus group discussions were structured around four categories of questions (see Appendix 1), with each category discussed for approximately 10 to 15 minutes. The role of the interviewer was to facilitate and moderate the sessions, intervening as necessary to ensure productive discussions, while also encouraging participants to elaborate on their responses and engage in meaningful conversations with one another (Crang & Cook, 2007). Notably, most students and educators mentioned the use of ChatGPT as examples of use cases and all the interviews were conducted from late March to April, around two weeks to a month after the GPT4 had already been released.

The sessions were conducted in English and lasted for about an hour each. The mean duration of all interviews is approximately 55.50 minutes, with a standard deviation of about 3.55 minutes, indicating that the durations are fairly close to the mean. Some participants were already familiar with each other or the interviewer, which facilitated spontaneous interactions and enabled participants to connect discussions to their personal experiences, which is a recognised benefit of relational groups (Kitzinger, 1995). Although the majority of sessions were conducted as focus groups, a few were formulated close to group interviews, particularly with undergraduate students who faced language challenges. In cases where participants struggled to express their thoughts in English and sought assistance in their native language (Japanese), the interviewer accommodated their requests. This approach ensured the adaptability of the sessions to cater to the participants' needs and preferences, maintaining discussions both engaging and productive.

4.3 Data Analysis

The data analysis applied to thematic analysis, which is a widely used method in qualitative research that involves identifying, analysing, and reporting patterns or themes within the data (Braun & Clarke, 2006). The primary purpose of the thematic data analysis method is to classify and reduce the data's complexity into comprehensible and manageable codes, categories, and themes (Peel, 2020). The data analysis process began with the transcription of the recorded interviews using the Whisper, automated transcription system. The interviewer subsequently reviewed and revised the transcriptions while listening to the actual recordings to ensure accuracy and completeness. The interviewer verified all transcripts by revisiting the recordings. These steps facilitated accurate depictions of the ongoing conversation, simplifying the process of tracing the interpretations derived from the raw data (Silverman, 2016).

The study respected the six-step process described by Braun and Clarke (2006). First, the analysis process began with a close reading of the transcriptions to become intimately familiar with the data. This was followed by the identification of initial codes representing meaningful segments of the text based on the interview questions. Second, it comprised of initial coding where relevant data extracts were systematically identified and labelled with codes that encapsulated their essence. The codes were examined to identify potential themes in the subsequent stage. Notably while producing initial codes, some potential themes linked to research questions were generated simultaneously. A combination of inductive and deductive approach of coding provides a balanced, comprehensive outlook of the data, as opposed to merely focusing on the frequency of codes detached from their context (Xu & Zammit, 2020). Hayes (2000) also states that proto-themes are the beginning of a theme and 'develop and change as the analysis progresses' (p. 176). The codes were gradually connected into broader themes, which were further refined and clustered based on their relevance to the research questions. Third, the themes represented patterns across the data set that held significance in relation to the research questions. The identified themes underwent a thorough review against the coded extracts and the entire data set, allowing for the refinement of themes. Some themes were combined, separated, and discarded based on their relevance and strength. Fourth in the ensuing stage, each remaining theme was defined and named, providing an understanding of the specific aspect of the data each theme represented. Fifth, the themes were named to encapsulate their core concepts succinctly. The final stage of the process involved the preparation of the report, where the analysis and data extracts were integrated into a coherent narrative. The research findings were then linked to the existing body of literature. The thematic analysis process was iterative, with revisiting and revising themes and patterns as the analysis progressed. Notably, in recent years Braun and Clarke have critically revisited thematic analysis and reflexivity, or the active examination of the researcher's biases and how they might influence the analysis, is a core component of this method. Reflexive Thematic Analysis values the researcher's subjective experience as the primary way to discern knowledge from data (Braun & Clarke, 2022). The goal is not to search for objectivity or remove bias, but instead to use the researcher's personal experience and values as the primary tool to make sense of data (Braun & Clarke, 2023). This approach enhanced the reliability and validity of the findings, providing a foundation for the discussion and conclusions of the study. The researcher was responsible for the coding process, and the resulting themes were subsequently deliberated with the supervising researcher.

4.4 Ethical Consideration

From the outset of the investigation, ethical considerations were prioritised. When conducting the focus groups, I respected the Swedish Research Council's (2017) ethical statement in the report and ensured that the research was conducted in Sweden with adults aged 18 and over and that it did not deal with sensitive topics. All research participants were informed about the consent form, which detailed their agreement to participate and the use of their data in the study. This consent form adhered to the ethical and legal guidelines on data usage set by the University of Gothenburg. Furthermore, before recording their voices during interviews, all interviewees were asked to grant permission for the

purpose of data analysis. Since the study's target population comprised adults (over 18 years old), they were capable of independently deciding whether to participate. Participants were informed of their right to withdraw their data from the study at any point during the research process. Also, the confidentiality of the 26 participants' information was maintained, with their identities remaining anonymous throughout the study. This measure was taken to safeguard the participants' identity and data privacy, regardless of the research topic not being deemed sensitive (Markham, 2018). In terms of the relationship between the researcher and the study participants, it is worth noting that the researcher, being a master's student at the University of Gothenburg, had a close connection with some participants from the university. The qualitative data collection method, specifically interviews, presented both advantages and drawbacks due to the close relationship. However as Guillemin and Heggen (2009) points out, the rapport between the researcher and participants, established prior to the study, are significant in maintaining ethical rigour in qualitative research. Finally, in order to protect the participants' identities, their individual home countries and interview transcripts were not included in the figure or appendix.

5. Findings

In this section, this paper presents the results of the focus group interview with educators and students, highlighting their perspectives on the use of AI-generated feedback and human feedback in higher education. The thematic analysis of educators' and students' interviews revealed three main themes, highlighting various aspects of feedback in the context of using generative AI tools such as ChatGPT alongside human educators.

5.1 Theme 1: Instrumental Feedback vs Holistic Feedback

The first theme emerged from both educators and students perspective. They assessed the value of instrumental feedback provided by generative AI while the holistic feedback provided by humans. Instrumental feedback refers to feedback on technical aspects such as grammar, structure, vocabulary and primarily focuses on specific tasks as considered lower-order concern. Holistic feedback that is connected with the concept of higher-order concern takes a more comprehensive approach when providing students with information about their performance. Holistic feedback manages the student's overall learning experience and background, encompassing not only academic progress but also personal growth and development.

5.1.1 Educators' Perspectives

Regarding the instrumental feedback, the educators shared their perspectives on the potential of AI-generated feedback in this context. Educator A highlighted the potential benefits of using AI-generated feedback for specific parts of the feedback process, particularly when reviewing the text for technical errors. They noted that AI might perform better in these instances, as it would not be subject to factors such as fatigue or lack of focus:

In some parts of the process, I give more instrumental feedback, like looking through the text. In that part, I guess AI could do the same job, probably better than me because it's not tired or not... (it's) always focused.... I would love to use AI-generated feedback when just reading a thesis almost done and needing to correct all the things and finding the things that AI could do. (Educator A)

On the other hand, Educator I pointed out the limitations of AI-generated feedback, emphasising that generative AI might only provide reliable feedback on surface-level features such as grammar and language. They argued that AI-generated feedback lacks the knowledge, understanding, and human experience necessary to assess more sophisticated intellectual aspects of the work:

If you were to ask [AI] to give you feedback on the writing you've done in an academic essay, it absolutely can do that. But again, the feedback is most reliable on surface-level features, such as grammar and language. When it comes to more sophisticated intellectual knowledge-based features, it doesn't have knowledge. And it doesn't have the ability or the human experience that it can use to understand the language in front of it. It doesn't have any sort of understanding. It's algorithms. It's maths. (Educator I)

These perspectives illustrate the educators' viewpoint of the potential value that AI-generated feedback may have when addressing technical aspects of writing, while also highlighting the idea regarding limitations of AI in providing more nuanced feedback on the intellectual content of a student's work. The educators' comments suggest that while they consider AI-generated feedback to might be useful for certain aspects of the feedback process, it cannot fully replace the knowledge, understanding, and human experience that educators bring to the table. Conversely, educators value holistic interactive feedback, which is generated through the relationship between the educator and student. The educators emphasised the importance of this type of feedback, as it takes into consideration the broader context of the student's work and personal circumstances, beyond just the written text. Educator A highlighted the ability of educators to generate holistic feedback, such as

reading between the lines and understand the underlying intentions and struggles of the student, which might not be explicitly mentioned in their work:

...as a teacher, you sometimes read between the lines in the sense that you can kind of figure out what the student is heading for, but is not able to do or write or conceive. And then you can steer and give feedback on that... I don't think that AI would do that...I think it would talk about this is not the topic and this is the wrong spelling and more on the instrumental part, not reading between the lines or seeing. (Educator A)

It's more instrumental, not as holistic. (Educator B)

Yeah more instrumental, yeah. (Educator A)

...Yeah. And that's how I give feedback often to students. I mean, more holistic and maybe think about this next time and when you're continuing. (Educator C)

Similarly, Educator B emphasised the adaptability of human educators in providing feedback based on the type of text and the unique relationship between the student and the educator, something that AI has not yet achieved.

As a human being, if you're a professional, experienced, you can see these things and adapt according to the context. But an AI can't do that yet. It also comes down to the understanding and the relationship the students have with the teacher and with the AI. How much agency are you putting into it? (Educator B)

Additionally, Educator E shared their perspective on the essential nature of holistic feedback, particularly when dealing with students who may have unrealistic expectations, underestimate the time needed for certain tasks, or face personal challenges that impact their work. They explained that an educator might encounter a student with unrealistic expectations or personal problems, and it is crucial for the educator to understand these issues and help the student adapt accordingly. They interpreted this type of feedback as essential because, without proper guidance at this stage, the student may not be able to progress to the stage of working on the text itself.

Furthermore, Educator F acknowledged AI's proficiency in predicting subsequent words but expressed concerns about its ability to evaluate factual accuracy in texts. Although they pointed out that if the language model becomes more of an interface on external knowledge stores it will get more 'factual consistency', this generative issue leaves AI feedback appearing 'good from far, but far from good', the necessity for improvements in AI's contextual understanding.

...What they're very good at is since they're just what they're good at is statistically predicting the next word... But where it doesn't give very good feedback currently is in terms of like the fact of the factual characteristics in the text, because and that's a generation issue...I suspect will be the expression in English is "good from far, but far from good". (Educator F)

Educator A suggested that AI could be employed to address the more instrumental aspects of feedback, while human teachers could focus on delivering a more nuanced learning experience. Educator D supported this idea, stating that humans can offer insights based on experience that AI systems might not be able to grasp, such as the feasibility of a student's proposed approach or the level of effort required for certain tasks. Educator I discussed the concept of higher-order and lower-order concerns within their unit. Higher-order concerns include following assignment directions, structure, argumentation, and academic conventions, which typically require human feedback. Lower-order concerns, such as grammar, spelling, and correct referencing format, are areas where AI-generated feedback can be more effective. They noted, 'So if students could use it (AI) for lower order concerns with factual answers, and I can support them in higher order concerns, that would be fantastic.'

However, educators also recognise the importance of their responsibility as human educators in the feedback process. Educator C emphasised that while AI can provide valuable feedback, teachers should always perform a final check to ensure accuracy and relevance. Educator B stated that we need to consider both the cost and benefits of generative AI. '...of course the efficiency part of it is such a huge benefit. But you have to weigh it against the costs and the costs is this lack of a holistic, pedagogical human perspective.' Educators expect that their approach to feedback is often holistic, encouraging students to consider the feedback in the context of their ongoing work.

These perspectives underscore the importance of holistic feedback in the educator-student relationship, which allows educators to provide tailored guidance based on the broader context of the student's work and personal circumstances. Educators perceive AI-generated feedback lacks the ability to fully understand and respond to such nuances, making the role of the human educator all the more vital in providing comprehensive, meaningful feedback.

5.1.2 Students' Perspectives

Regarding instrumental feedback, students stated that the use of AI for this purpose has several advantages, including improving academic writing, providing repetitive feedback, and offering general opinion feedback. AI tools have shown to be effective in helping students enhance their academic writing. As Student F mentioned, '*the AI tool is much better than a human. Because it has access to a lot more of data,*' this vast data access allows AI to identify potential issues with originality or obscure sources, something that humans may struggle with due to limited knowledge.

Students also appreciate the ability of AI to rephrase and provide repetitive feedback. According to Student C, AI can offer constant feedback, unlike humans who may stop when they believe they have provided enough input. This continuous feedback loop allows students to keep refining their work and receive diverse suggestions for improvement. In addition to these benefits, Student E exemplified that AI-generated feedback can be sufficient for general opinion feedback, particularly when peers are involved. They shared the experience of exchanging papers with fellow students for comments and improvements.

...in the last module we had a session that we needed to write a paper...we exchanged the paper and we commented (to) each other to improve the paper. But it was peer level. So I would say it was helpful because you could get other perspectives. But maybe in that level AI could also do (it). Because we all worked in a very different level on topics. So the comment was very general...So it depends on what level you expect from the feedback. (Student E)

They mentioned that, in such cases, AI could potentially offer similar insights as their peers, especially when working on different topics. They indicated that AI-generated feedback can be an effective alternative to human input when seeking diverse perspectives and general opinions on a student's work. Additionally, students understood the responses of generative AI could be updated how they give feedback as an input.

It's machine learning. You need to give some feedback. (Student I)

So it's dependable how you ask ChatGPT ...This is the main point. If you divide your answer really nicely and think that ChatGPT is a child and you need to tell them in simple words and everything. (Student K)

On the other hand, the point of holistic feedback students mentioned was the importance of human feedback, which includes elements such as nuanced feedback, context-based insights, professional expertise, and encouragement. For students, human feedback is perceived as highly valued for its nuanced nature as educators expected. Student A pointed out, AI-generated feedback may lack '*the human part of it, the body language, the facial expressions, the emotions, the way how you speak...*' This highlights that students perceive the importance of the personal touch and emotional

understanding that humans bring to the feedback process, something that AI tools currently cannot replicate.

Students also showed their expectation to educators to provide context-based, professional feedback that is tailored to their specific needs. Student C emphasised the importance of learning from the teacher's experience and not just the knowledge itself, suggesting that the human touch can reveal insights that may be hidden from AI tools.

...And also in pedagogical thing you need to highlight that the student (who) come(s) to the school want(s) to learn from the teacher and lecture experience, not knowledge itself. (Student C)

Similarly, student L mentioned that when seeking answers to questions, a teacher's response is more meaningful because they understand the context of the entire class content. Student D acknowledged the role of teachers in using pedagogy to inspire students and promote their intellectual growth. They recognise this aspect of feedback could be crucial for motivating students and nurturing their development, which may not be effectively achieved through AI-generated feedback alone.

Students recognised that AI-generated feedback may be better suited to addressing lower order concerns, such as grammar and syntax, while higher order concerns require the intervention of human educators. Student B stated that 'I don't think AI generated feedback will replace or should replace human feedback at all'. Similarly, Student J highlighted the importance of balance between AI and human feedback, stating that AI feedback should be the first step in the feedback process, followed by human feedback to address more complex issues.

This sentiment was echoed by other students who value human feedback for its ability to provide nuance and contextual understanding. Student A noted that 'there is also this psychological and emotional aspect that AI will not [have]', suggesting that AI feedback may not be able to provide the same level of personalised, supportive feedback as a human educator. Students also recognised the importance of the pedagogical relationship between students and educators, which requires a level of human interaction that AI-generated feedback may not be able to provide. Student C highlighted the importance of contextual understanding, stating that 'in pedagogical things you need to highlight that the student comes to the school wanting to learn from the teacher and lecture experience not knowledge itself,' emphasising the importance of the relationship between students and educators in the learning process.

5.2 Theme 2: Emotional and Relational Impact of Feedback

The second theme examines the role of emotions in the feedback process. It highlights the importance of providing encouragement and emotional support alongside academic guidance. Emotional and relational support by educators highlights the importance of considering their emotional well-being and engagement of students in the feedback process.

5.2.1 Educators' Perspectives

Educators discussed their responsibilities as teachers in providing feedback that fosters students' agency and motivation while also considering the potential role of generative AI in offering early support to alleviate stress. Educator B emphasised the significant responsibility they hold as a teacher in maintaining the motivation of their students, highlighting that focusing solely on instrumental feedback might lead to a drop in student motivation. They believe it is essential to acknowledge the students' efforts in their work, an aspect that AI cannot yet handle effectively.

On the other hand, Educator I considered the potential of generative AI, such as ChatGPT, in addressing emotional challenges students might face during the learning process. They pointed out that emotional aspects, such as feeling overwhelmed or experiencing procrastination, play a significant role in student learning.

...So if a student is feeling overwhelmed or they don't know where to go or where to start, I think that they could interact with ChatGPT and get some pretty good support. (Educator I)

These perspectives illustrate the importance of emotional and relational support in the feedback process. While human educators play a crucial role in fostering students' agency and motivation, generative AI may offer valuable early support to help alleviate stress and address emotional challenges in the learning process. However, educators pointed out that AI-generated feedback currently may lack the ability to provide the same level of emotional and relational support as a human educator, indicating that a balanced approach may be necessary to ensure the best outcomes for students.

Interestingly, the potential pitfalls of educators providing overly attentive feedback to students was discussed. Such feedback may not adequately convey criticism or the severity of comments, which can result in students misunderstanding the intended message or not taking necessary action. Educator F shared their experience with providing feedback that was coated in 'so much niceness' that it did not effectively communicate the intended message to the student. They mentioned that there had been instances where their feedback came across as harsh and emotionally affected the student in an unproductive way. However, there were also situations where the feedback was quite substantial but was presented so gently that the student was unable to grasp the severity of the comments. This led to a discussion with Educator D and Educator E about the importance of striking the right balance in feedback delivery to ensure students understand the critique and take appropriate action.

Educator H expressed concern about students who claim to understand the feedback provided but may not have genuinely comprehended the message. They consider this as one of the most challenging emotional responses to deal with, as it becomes difficult to gauge if the feedback has indeed reached the student effectively. These insights underline the importance of educators finding the right balance in providing feedback that is both supportive and clear in its intended message.

Furthermore, educators recognised that generative AI feedback can scaffold students' understanding of academic concepts and help them adapt to the emotional response elicited by their educators' critical feedback. Educator I highlighted the potential of ChatGPT to assist students grappling with challenging academic concepts. They noted that students often come to them for advice on understanding the difference between methodology and method, for example. In such cases, ChatGPT can be a valuable resource to help clarify these complex ideas. Generative AI can also help educators provide feedback that is better tailored to a student's emotional needs. Educator D and Educator F discussed the possibility of adjusting the tone of the AI-generated feedback to be friendlier or less friendly, depending on the individual student's requirements.

Educator G also suggested that ChatGPT could serve as a 'phrase bank' to help formulate feedback sandwiches, beginning with positive aspects before addressing areas that need improvement. They noted that, as a non-native English speaker, they could use ChatGPT to craft feedback that is sensitive to a student's emotional needs, reducing the likelihood of an adverse reaction while still conveying the necessary information. This approach demonstrates how AI can complement human educators in delivering more effective and tailored feedback to students.

5.2.2 Students' Perspectives

For students, generative AI feedback was perceived as less emotionally charged and less serious than feedback from human educators. This can result in students taking AI feedback with a lighter attitude, as Student P highlights,

I think I would take the critique by the teacher more to heart and the AI sort of, maybe more in line in a sort of way as an online quiz or something where I get a score like a percentage and you're just like, oh yeah, I have to do it again. But you don't take it so much to heart (Student P).

Notably, the reduced emotional impact of AI feedback can also create a psychologically safe environment for students, making them feel more comfortable to ask 'silly' questions. Student F points out the benefits of this, stating,

I think you also said it a little bit when you spoke about feeling less shy to ask questions maybe, also silly questions. So there's that. And that's very positive. Maybe you feel more at ease. (Student F)

They mentioned this increased comfort might encourage students who are hesitant to ask for help from human educators to seek assistance from AI. Furthermore, they stated that the emotionally neutral nature of AI-generated feedback allows students to more easily accept or reject the suggestions made. Unlike feedback from human educators, which can carry emotional weight and expectations, AI feedback is perceived as less authoritative. As one student explained, the advantage of AI-generated feedback lies in the ability to comfortably accept or reject the AI's comments, whereas the feedback from an educator is often perceived as something that must be accepted. This provides students with a sense of autonomy when engaging with AI-generated feedback, enabling them to decide whether to incorporate the suggestions into their work or disregard them without fear of negative consequences.

On the other hand, students expressed that receiving feedback from human educators can provide them with psychological reassurance, helping to understand that their struggles are not unique. One student highlights the emotional aspect of feedback and how it can make them feel less isolated in their academic journey, something that AI-generated feedback may not be able to achieve. Furthermore, the importance of a good relationship with educators and the respect that students have for them plays a significant role in how feedback is received and acted upon. Another student emphasises the emotional impact of receiving positive feedback from a respected educator, explaining that it can make them feel proud and validated. On the other hand, negative feedback from a respected educator can be disheartening, but it is also trusted, leading the student to reflect on their work and make necessary adjustments. Student F highlights that the level of respect and admiration they have for their educator greatly influences how they perceive and act upon the feedback they receive.

If I receive feedback from someone I really respect, if it is positive feedback, it will make me feel so happy and good. I really want to get approval and to feel like I respect that person so much, I will feel so proud of myself if I receive good feedback from them. And if I receive negative feedback, I will be very sad, but I will also trust them. So I will also feel like, okay, this needs to change. If I respect that person, then I think, okay, they are right anyways, this hurts me, but this is true. (Student F)

From students' voices, emotional support from educators is a prominent aspect of the educational experience. Students often expect that their teachers or professors will be able to provide ethical feedback closely tied to their emotions. According to Student N, the ideal balance between human and AI involvement in education would involve human educators addressing emotional aspects, such as providing support when students feel stressed, while AI technologies can handle more technical aspects.

I think I would go the ideal balance for me between human and AI would be that for human, I would go for that for the feelings, for the emotion. If I am feeling stressed or something, I know that that teacher, classmate or whatever will help me with his or her feedback. Whereas for AI generated, I would go only for, or mostly for information related to things. (Student N)

Student Q also highlighted the need for human educators to be involved in addressing the emotional aspects of student learning. They suggested that, while students can use AI tools like ChatGPT to create their own work, human educators should still play a role in checking the ethical implications of the content and providing guidance on how it might be perceived by others. This could involve suggesting alternative phrasing or word choice that would be more positively received by the intended audience.

I think to like teach AI that student's curiosity or something, and then ChatGPT can suggest more like exciting statement to excite students to like motivate themselves. ...more giving positive feedback...to give an example related to their, like their interest. (Student Q)

In addition to the emotional support provided by human educators, there is an expectation for AI technologies to evolve and offer more personalised and emotionally supportive interactions. The students interviewed emphasise the importance of emotional support in the educational experience, with human educators taking the lead in providing ethical and emotion-focused feedback. However, they also expressed the hope that AI technologies will become more personalised and capable of emotional supportive feedback, complementing the efforts of human educators and enhancing the overall learning experience.

The interviews demonstrate the importance of the relationship between students and their educators in the feedback process. The emotional and relational support that human educators can offer, along with their ability to understand the unique challenges faced by each student, can make a significant difference in the way feedback is received and applied. Students place value on the personal connection, mutual respect between educators and students as elements that AI-generated feedback may not be able to replicate, emphasising the value of human interaction in the feedback process.

5.3 Theme 3: Ethical Concerns and Risks

Third theme emerged as ethical issues related to using AI-generated feedback in higher education. Educators addressed the challenges posed by data protection regulations such as GDPR in the European context. It was also mentioned disparities in access to feedback based on financial resources and digital literacy. Moreover, they reported the issues of bias and hallucination in feedback, expressed concerns about biases in AI-generated feedback and the need to understand how AI algorithms function to avoid potential pitfalls. Students also expressed concerns over the lack of transparency in generative AI feedback, citing difficulties in verifying credibility and accuracy. They felt uneasy about the 'black box' nature of these systems and feared potential biases and misinformation. Notably compared to educators, students were unaware of the risks associated with sharing personal data with AI platforms.

5.3.1 Educators' Perspectives

Educators firstly noted that the GDPR (General Data Protection Regulation) presents significant ethical concerns regarding the use of generative AI feedback, such as ChatGPT, within the EU and other parts of Europe. Educators perceive themselves as subject to strict regulations, and promoting the use of such technology not only for themselves but also for their students raises ethical questions.

Educator B expressed concerns about data being sent to California, given that GDPR is in effect in Europe. They highlighted the restrictions on using ChatGPT for providing feedback on student texts, as teachers are not allowed to upload student work due to GDPR compliance. Students, however, are

permitted to do so themselves. Educator I discussed how using ChatGPT can violate GDPR by not allowing individuals the right to be forgotten. They pointed out that encouraging students to use the platform might inadvertently lead to students providing free labour for the company behind the AI, which profits from the user interactions and algorithm improvements.

It violates GDPR in the sense that, at least the last time I read their terms and conditions... Essentially, if we encourage our students to use it, we're encouraging them to provide free labour to open AI that they will use to profit from and build and improve this algorithm. So that's a problem. (Educator I)

The restrictions would extend to students as well, as Educator G mentioned that starting from the upcoming autumn term in 2023, students will be required to adhere to university rules regarding the handling of personal data. Consequently, students would not be allowed to use any software, platforms, or systems not provided by the university when working with their data from the autumn in 2023. This change is expected to further limit the use of AI feedback tools like ChatGPT in academic settings.

Educators mentioned the use of AI-generated feedback can lead to disparities in access for students based on their financial capabilities and literacy levels. Educator F expressed concerns about the financial inequalities that arise from using AI feedback systems.

Inequalities around students with financial wealth right now...so at the moment, if you pay \$20 a month, you can get a much better model and you can also plug in and then you can start subscribing to things...if you spend like \$60, \$70 a month, you can put together an incredibly powerful system, which is dramatically more powerful for producing schoolwork or university work than the free version. So that's a very obvious kind of inequality that's reproduced. (Educator F)

They noted that students who can afford to pay for premium models receive a significantly better experience, which in turn offers them a greater advantage when producing academic work compared to those using the free version. Educator E provided an example of this issue, mentioning a Facebook group where individuals from countries with lower financial resources struggle to afford the \$20 monthly fee for a more advanced version of the AI such as ChatGPT. Literacy disparities also arise as a result of unequal opportunities to utilise AI-generated feedback. Educator I highlighted the ethical concerns this creates in teaching and learning. They pointed out that students who are already knowledgeable and well-versed in course content and academic integrity can benefit the most from generative AI as tools. Conversely, those who are struggling or potentially failing may face even greater challenges, as they may not know how to use AI-generated feedback effectively, increasing their likelihood of failure. This inequity presents a significant ethical dilemma in the context of education and the adoption of AI feedback systems.

Additionally, the presence of bias and hallucination in AI-generated feedback was considered a significant concern among educators. The potential failure to encompass cultural diversity and the impact of biases on the next generation of AI systems were recognised as two major challenges. Educator I expressed deep concerns about the biases present in the programming of AI algorithms like ChatGPT. They highlighted that in order to filter out inappropriate language and bias, the programmers themselves had to be exposed to these biases during the coding process. Educator B also addressed the issue of bias in the large volume of texts generated by AI systems, noting that these texts will form the foundation for the next generation of AI models, potentially perpetuating bias further.

And also, the question regarding bias. And I think that the big question here is that the next, I mean, we are pumping out so many texts right now from these systems. And those texts obviously contain bias. And those texts will be the foundation for the next generation. (Educator B)

Educator A brought up the importance of cultural diversity and how it might not be fully considered by AI systems. They pointed out the potential ethical issues that arise from AI not recognising biases, prejudices, or inequities stemming from cultural differences in education systems, such as those between Swedish, American, and Chinese institutions.

In addition to biases, it is crucial for educators and students to be aware of the possibility of hallucination in AI-generated feedback. Educator I explained that this term refers to the unintentional production of inaccurate or misleading information by the AI, rather than a deliberate lie. Understanding the underlying algorithms and their limitations is essential in order to discern between accurate feedback and hallucination.

But the reason why it's called a hallucination and not a lie, and it's not made up really. Is because it has no ability, it has no intention behind it. And unless you recognize what is actually happening in this algorithm, what the output is and is not. (Educator I)

Moreover, drawing from the interview quote, it becomes evident that there are prevalent concerns regarding anthropomorphization, or attributing human-like traits, to the outputs generated by AI systems. Educator F emphasises the danger in assuming emotional states or human-like consciousness in machine responses, which could lead to misinterpretations and distorted expectations about the capabilities and roles of these systems in the learning process.

...I have this real issue with anthropomorphizing, like when they try to anthropomorphize outputs from these machines....whenever we have these kind of like machines, we try to interpret an emotional state from them....it's dangerous....I think they should be constantly making it obvious that they're not human. (Educator F)

5.3.2 Students' Perspectives

The lack of transparency in the structure and content of generative AI feedback is a concern for some students, who find the 'black box' nature of these systems unsettling. One student expresses their unease about not knowing how the program works, the dataset used, the programming involved, or the basis for the answers provided.

For me the biggest trouble of this generative AI is that we don't know how the program is working. So it's complete black box... (Student E)

This uncertainty leads students to feel difficulties in verifying the credibility and accuracy of the AI-generated feedback. Another student also expresses a preference for human feedback, stating that they are more inclined to trust it over AI-generated feedback. They mention that they struggle to trust the comments provided by AI-generated feedback, as they cannot discern the origin or rationale behind the comments. This lack of clarity and transparency contributes to a sense of unease and mistrust towards AI-generated feedback for some students. These concerns highlight the importance of transparency in AI systems, as understanding how feedback is generated and the rationale behind it can significantly impact students' trust and confidence in the feedback they receive. The uncertainty surrounding the 'black box' nature of AI-generated feedback may be a barrier to its acceptance and adoption in educational settings, emphasising the need for clear explanations and accountability in the development and deployment of these systems.

Same as the discussions among educators, the accumulation of human biases is inevitable in AI feedback, making students susceptible to biases that already exist in the data. Student D recognised that generative AI itself is not responsible for creating biases, but rather it is using the already biased data made by humans. Student C suggested it is important for both teachers and students to be aware of their own biases and expected teachers to have pedagogical knowledge to manage them.

...And then also missing behind AI also controlled by human(s).... It will be not direct like the feedback and in this sense, human(s) need to be at least especially for the teacher need to have pedagogical in this sense to give the feedback rather than just put all of the thing to AI and to the machines. And then what it's what to say that like what is the role of teacher in that sense need to be. (Student C)

Student N also shared their concern about the potential for discrimination in AI feedback due to the biased data generated by humans. The possibility of hallucination in AI feedback also raises the question of the trustworthiness of the output for students as well. Student A explained, if the AI generates its own information without relying on a factual basis, the trustworthiness of the feedback becomes even more uncertain. Student M also indicated initial discomfort in seeking human feedback but found it credible once received. In contrast, while AI feedback was easy to access, they expressed suspicion about its reliability.

...I feel like it's a bit nervous to ask someone to question first time. But once you asked, maybe some people are not. But most of them gave us feedback kindly. And I don't feel like so bad. And it has more credibility than the AI generated, I think. And when I ask something to AI, I think it's really easy to question at any time. But at the same time, I think they have some wrong information or are included. So I feel like I cannot rely on 100% of that information. I'm not feeling nervous, but it's like suspicious. (Student M)

On the other hand, the students' interviews revealed that some students are not aware of the risks associated with sharing their personal data with ChatGPT. For instance, Student M mentioned that ChatGPT could provide better answers if more detailed data was provided, but at the same time, it means that ChatGPT would be privy to the student's personal information. Student L was not sure whether ChatGPT collected all the information that students put in and was surprised to learn that creating an account with ChatGPT meant that their information could be easily accessed by the service provider. Student P also stated they did not think about ethical issues or some risks, as they mentioned: *'I haven't really thought about that much because I just use it for fun.'* Student L further admitted that they were not aware of this risk and stated it would be good to have the opportunity to discuss issues around using generative AI as it raises their awareness of ethical issues.

6. Discussion

The era of generative AI has undeniably been transforming the landscape of higher education, impacting all facets, including feedback phenomena. While the potential of AI in providing general feedback is evident, the question of how AI fits into the broader spectrum of feedback—especially the social, relational and ethical aspects—is worth investigating. This chapter revisits the values of generative AI and human educators and issues between them, contemplating the intersection of dialogism, dialogic feedback, and issues of trust around generative AI context.

6.1 Good from Far, Far from Good?

According to Hattie and Timperley (2007)'s model, generative AI indeed offers continuous feedback, something students find easier to solicit than from their educators. The appeal of this system lies in its ability to provide immediate feedback, as previous research has shown its effectiveness during task mastery, enabling quicker error correction and learning acceleration. However, Hattie and Timperley (2007) also noted that redundant task-level immediate feedback may lead students to focus on short-sighted goals and not on strategies to achieve them. Currently, it appears from the results, that students predominantly utilise AI feedback at the task level, tackling lower order concerns. Nevertheless, some students find the AI sufficient for general feedback and replaceable to human feedback in that sense, acknowledging that the AI's responses vary based on their queries and initial information input. This implicates their awareness of the dynamic nature of AI feedback, influenced by the students' output.

Consequently, this study prompts further questions. How can students elicit desired self-regulatory or self-level feedback, which is more complex and sophisticated with generative AI? When addressing student queries or providing feedback, professional human educators consider higher-order concerns such as context, background knowledge, and students' prior experiences, leading to more comprehensive and insightful responses. In contrast, AI tools tend to focus on lower-order concerns by providing quick, surface-level responses. This disparity may highlight the importance of maintaining a balance between human and AI involvement in education, as AI technologies have yet to match the in-depth understanding and consideration that human educators can provide. This contrasts with human educators who are expected to provide holistic feedback across wider levels with minimal interaction, drawing from their comprehensive communication with students.

Furthermore, students' perception of generative AI feedback is a critical aspect to consider. Some students may not take AI feedback as not serious as feedback given by humans. This perception might stem from the current limitations of AI in addressing higher order concerns such as organisation, argumentation, and evidence, which significantly impact the overall quality of the output. This implies the current limitations of generative AI in education, as it may provide superficial feedback without meticulous ingenuity that doesn't reach the higher levels of Hattie and Timperley's feedback framework. On the other hand, the dynamic nature of AI feedback, where the output changes based on student input, exhibits an interesting parallel to the concept of feed up, feedback and feed forward. As Hattie and Timperley (2007) discussed, Feed up establishes clear goals and expectations, guiding students on their learning path. Feedback assesses progress, acknowledging strengths and identifying areas for improvement. Feed forward offers specific strategies for enhancing learning outcomes. This dynamic response of AI feedback presents potential for growth and development, yet also reveals the need for careful student input to elicit the desired feedback.

The current state of affairs reveals that the significant distinction between generative AI and human interaction could lie in the modality of feedback provided, be it text-based or verbal. As of Spring 2023, the current mode of generative AI feedback, predominantly text-based, offers potential for further investigation and progression. According to Alharbi (2022), the research indicates that the use of auditory feedback is more effective than written feedback. This finding implies that generative AI

may enhance its capabilities in generating audible feedback. Furthermore, a fundamental element of human communication often overlooked in AI dialogues is the occurrence of minimal speech—small verbal and nonverbal cues that underpin seamless and effective human interaction (Lindwall et al., 2022). Such cues, affirming comprehension, displaying empathy, or offering encouragement, vastly improve the quality of interpersonal exchanges. Conversely AI systems, such as ChatGPT, grapple with emulating these delicate yet essential conversation components, leading to a less engaging and supportive learning environment compared to support by human educators. Students have indicated that multimodal interactions, incorporating voice-based dialogues with the generative AI, could substantially boost communication quality. While this could potentially enhance the AI's ability to deliver more nuanced, context-aware feedback, addressing higher-order concerns and more complex feedback levels, there still may remain a discrepancy in comprehending the student's individual background and nuanced context.

While the adoption of generative AI in education shows promise, particularly in addressing lower order concerns and providing immediate feedback, it's critical to continue exploring its potential and limitations in providing higher level feedback. Balancing the use of AI with human educators' expertise might be a viable approach to maximise the benefits of both, while ensuring an effective and comprehensive feedback process in education. Additionally, from students' insights, consider operating effective prompts into generative AI to provide higher-order feedback, given that the AI's output can vary based on the conditionality of the input sentences.

6.2 Dialogism and Feedback in the Era of Generative AI

As we move further into the era of generative AI, the principles of dialogism and its implications for feedback become increasingly significant. The principle of dialogism underscores the collaborative, multifaceted nature of meaning-making in human communication (Linell, 2007; 2009). When applied to feedback, dialogism highlights the importance of interaction, the context of communication, and the mutual interpretation of meanings, intentions, and implications. Feedback becomes more than just information on the quality or effectiveness of an action or behaviour—it becomes a dynamic, interactive process where feedback receivers and givers alike contribute to the shared understanding of feedback (Price, et al., 2011). Such interaction is integral in feedback processes, requiring a reciprocal exchange of ideas, emotions, and understandings between the feedback giver and receiver (Steen-Utheim & Wittek, 2017). The question then arises: how can this be considered generative AI systems, whose capabilities are primarily dictated by algorithms in the theoretical framework of dialogism?

Generative AI, given its ability to rapidly process vast amounts of data and produce output, can provide instant feedback with conversational style. However, the dialogic theory underscores that feedback should not merely be unidirectional; instead, it should be an ongoing, interactive dialogue that facilitates mutual understanding (Carless & Winstone, 2020). Despite the efficiency of AI in providing feedback, it may still lack the ability to consider the nuanced elements of human communication, such as contextual understanding and the emotional dimensions of the feedback process. These elements are instrumental in fostering a conducive learning environment, facilitating self-reflection, and encouraging a growth mindset among learners (Boud & Molloy, 2013b). Both students and educators recognise that humans offer a more holistic understanding of context, leveraging their previous experiences, background knowledge, and cultural norms to extend feedback. This results in a more layered and insightful response, underscoring the vital role of human educators in preserving the depth of dialogue-based feedback. Hence, to fully harness the potential of feedback, an equilibrated integration of generative AI and human educators feedback is indispensable. In this sense, the dichotomy between AI and human educators underscores distinct advantages and limitations.

It is essential to emphasise that this is not just about disparate capabilities but also about differences in categorisation. AI systems and humans fall into distinct categories, and these differences have

implications for how they communicate and provide feedback. AI, being computational, is perceived to be bound by algorithms and lacks the personal touch, empathy, and contextual understanding that a human can provide. A human, on the other hand, is expected to draw on personal experience and emotional understanding, providing feedback that's not just technically correct but also emotionally intelligent and contextually relevant. This brings us to the crux of the matter: it is not just about improving AI's capabilities but also about understanding and respecting the unique strengths of both categories – the efficiency and consistency of AI and the empathy and contextual understanding of humans. Balancing these strengths can lead to a more effective and enriching feedback process.

Emotional, relational aspects are significant in feedback, contributing to the creation of a conducive learning environment that fosters progress (Dowden et al., 2013; Steen-Utheim & Wittek, 2017). Feedback interactions, imbued with emotional elements, can impact how feedback is perceived and acted upon by students. Trustworthy relationships between teachers and students are paramount in improving students' uptake of feedback (Steen-Utheim & Wittek, 2017). Generative AI, in its current state, struggles to replicate the emotional and relational aspects of feedback interactions. Such feedback requires a deep understanding of the student as an individual—a complex task that AI has yet to accomplish fully. Despite advances in AI technology, the nuances of human emotion and relationship-building are challenging to encode algorithmically. The absence of these critical elements can result in feedback that feels impersonal and detached, potentially diminishing student engagement and learning. In contrast, human educators can provide emotional and relational support in feedback interactions, drawing from their own experiences and empathetic understanding. Such feedback, grounded in trust and understanding, can foster a growth mindset, encouraging students to actively engage with the feedback and pursue their learning objectives.

In the era of generative AI, the role of AI and human educators in feedback provision becomes a balancing act. On one hand, AI offers efficiency, standardisation, and immediacy, facilitating the provision of general feedback. On the other hand, human educators offer emotional intelligence, contextual understanding, and the capacity to build trusting relationships, which are vital for holistic, self-level feedback. However, this doesn't necessarily mean that AI and human educators are in competition. Instead, they can complement each other, creating a synergistic relationship that enhances the feedback process as both students and educators emphasised in their interviews. AI can handle the more transactional, general aspects of feedback, freeing up human educators to concentrate on the more nuanced, emotional, and relational aspects. By exploring potential to integrate AI and human feedback, we can capitalise on the strengths of both, creating a more comprehensive, balanced, and effective feedback system.

6.3 Trust in Generative AI

Delving deeper into the topic of trust in AI, especially in the context of feedback in education, a closer look at the findings reveals that this notion has various dimensions. One key aspect of trust is tied to competence trust, which denotes an individual's confidence in another's efficiency and effectiveness in completing tasks (Carless, 2012). According to the results, there seems to be a degree of competence trust among educators and students, who express trust in AI's proficiency in dealing with lower-order concerns. Nevertheless, the responses also indicate a certain degree of mistrust, as human oversight is still seen as indispensable to ensure the credibility of AI-generated feedback. The findings highlighted a disparity between educators and students in their comprehension of generative AI technology and particularly related ethical issues, indicating that confidence in AI is also dependent on one's domain expertise and faith in personal competencies (Sabzalieva & Valentini, 2023). The ensuing potential unawareness of risks tied to personal data sharing is worrisome, particularly considering the growing dependence on AI technologies. This underlines the necessity for students to be educated about these potential hazards and trained on how to safeguard their private information. Educational institutions bear the responsibility of instructing students on the consequences of using AI technologies, and the

vital importance of protecting their personal data. It is imperative that students are armed with the knowledge and skills to make well-informed decisions about the use of these technologies.

Extending the notion of competence trust, Carless (2012) defines communication trust as the faith that a conversation partner is sharing information openly and genuinely cares for one's best interests. In light of Ivarsson and Lindwall' (2023) argument that distinguishing between human and artificial communication is becoming increasingly challenging, the notion of communication trust becomes more considerable. The perspective is echoed in results, where both educators and students express reservations about AI's capacity to understand and address emotional and relational aspects integral to the learning process. This highlights the critical role of human educators in addressing higher-order concerns and providing emotional support, underscoring the need for trust in AI's emotional intelligence to be further developed. Furthermore, Glikson and Woolley (2020) propose trust in AI is also influenced by the system's tangibility, transparency, reliability, and promptness. The results validate this assertion, with educators and students expressing the need for transparency and reliability in AI, while also voicing the necessity for human intervention to ensure the relevance of AI feedback. This discussion ties back to the relational aspect of trust, which underscores the invaluable role of human educators (Curzon-Hobson, 2002).

The pivotal question that arises is whether AI can acquire human trust by merely enhancing its capabilities. The concerns raised by Porcheron et al. (2018) regarding the anthropomorphisation of conversational technologies and Button et al.'s (2022) statement on the potential confusion stemming from the use of natural language phrases echo the worries expressed by educators about ethical concerns in AI. This also suggests that 'category', rather than just 'competence', might serve as a crucial issue in considering trust between humans and AI. Garfinkel's (1963) conceptualisation of trust as a fundamental order — a prerequisite condition rather than an outcome of action — is expanded upon by Ivarsson and Lindwall (2023) in relation to conversational AI. This perspective posits that trust could be regarded as an inherent requisite for the acceptance and widespread deployment of AI within educational contexts. While AI is anticipated to acquire higher-order functionalities as technology progresses, ethical reservations persist concerning the anthropomorphisation of AI, as highlighted by Porcheron et al. (2018) and Ivarsson and Lindwall (2023). Even if AI were to evolve towards more advanced, human-like cognitive outputs in the future, the challenge remains of whether it can transcend the categorisation of 'human' and 'AI'. Furthermore, it is a matter of debate whether this categorical crossing is a desirable objective in the first place. A perspective on how generative AI could gain trust in different categories from humans could encourage the prudent and ethical use of AI technology.

7. Conclusion and Implications

This study examined how students and educators in higher education view feedback generated by large-language model AI, particularly in comparison to feedback given by human educators and considered from the viewpoints of dialogism. The findings and discussion highlighted in the previous chapter underscore the transformation in the higher education landscape brought about by the advent of generative AI in the context of feedback provision. While both educators and students expect generative AI to have potential in delivering instrumental personalised feedback, its limitations in engaging with holistic and higher order concerns including context of students' work, emerge as clear areas for improvement. Furthermore, the nuances of dialogism and the relational aspects of feedback that are characteristic of human interactions may yet to be mirrored effectively by AI. The principles of dialogism and dialogic feedback offer valuable insights for enhancing the role of generative AI in feedback provision. By integrating aspects of dialogic feedback, generative AI could potentially become more interactive and contextualised, complementing the role of human educators.

Nevertheless, the emotional and relational aspects of feedback may likely remain the domain of human educators, underscoring the continued relevance of humans in education despite the rise of AI. Trust in generative AI is multi-faceted, spanning competence, communication, and relational aspects. While some trust exists in AI's proficiency, there's scepticism regarding its emotional intelligence and ethical issues. Furthermore, transparency, reliability, and human oversight are deemed crucial. As AI's capabilities evolve, trust may become an inherent prerequisite for its acceptance and usage in education. However, ethical concerns persist, questioning whether AI should even aim to transcend its 'category'. This leads to a call for careful, ethical application of generative AI in higher education.

As we continue to navigate the era of generative AI, it is essential to continually reassess the ethical concerns of managing AI and recalibrate the balance between AI and human feedback. Despite the rapid advancement of technologies, including generative AI, enhanced capabilities may not equate to full human trust in AI. Additionally, attributing human characteristics to AI brings with it a multitude of ethical dilemmas. The fusion of the emotional intelligence of AI and human educators will lead to a more dynamic, engaging and effective educational experience, but only after a deep conceptual understanding of both and on a trial-and-error basis. Policymakers, educational institutions, teachers, and students need to be aware of the potential risks and deal with ethical issues associated with AI use in education, and strategies need to be implemented to manage these risks effectively. As generative AI continues to evolve and improve, it is essential to continue exploring its potential and limitations in providing feedback in education. Continuous dialogue and discussion on the use of feedback of generative AI is required, based on a correct assessment of the functional aspects of generative AI, ethical concern and risk with appropriate guidelines.

For policymakers and higher educational institutions, these findings offer several implications. Previous research posits that present-day universities, as pillars of higher education, shoulder the responsibility of fostering skills essential for manoeuvring the intricate, swiftly evolving interplay between individuals, knowledge resources, tools, and learning spaces emblematic of our current era. These institutions are anticipated to spearhead the understanding of generative AI technologies, which are projected to progress further in the future. It is fundamental for those who are responsible to manage educational policy to consider the ethical and privacy implications of using generative AI in, such as data protection and the potential for algorithmic bias. Moreover, they need to be aware of limitations of AI as the inability to provide nuanced, context-sensitive feedback and its lack of emotional and relational understanding might lead to superficial feedback that fails to address higher order concerns. Policymakers and institutions should contemplate these risks and limitations when developing policies related to the integration of generative AI in education. Policies should emphasise ethical consideration and a balanced approach, leveraging the strengths of AI while recognising the irreplaceable role of human educators in providing comprehensive, empathetic, and relationally-aware feedback. Institutions should also invest in training for educators to effectively use generative AI tools and interpret AI-generated feedback. Furthermore, institutions should be proactive in managing the

risks associated with AI use. This includes implementing robust data protection measures, developing guidelines for ethical AI use, and fostering an environment of critical thinking and risk awareness among students and educators. Institutions should also consider student perceptions and attitudes towards AI feedback, as these can impact the effectiveness of feedback and student learning outcomes.

For educators and teachers, the rise of generative AI presents both opportunities and challenges. Generative AI has a capability to handle instrumental feedback, potentially freeing up time for teachers to focus on higher order concerns and the relational aspects of feedback. However, teachers need to be aware of the limitations of AI feedback and the risk of over-reliance on AI. They should aim to supplement AI feedback with their own, particularly for complex tasks that require nuanced, context-sensitive feedback. Educators also need to foster a growth mindset among students, encouraging them to actively engage with AI feedback and use it as a tool for self-regulated learning. To do this effectively, teachers need to be equipped with the necessary skills and knowledge to use AI tools and interpret AI-generated feedback. This underscores the importance of professional development in the era of AI. Educators and teachers also may have the responsibility to foster an environment of critical thinking and risk awareness for students, helping them navigate the complexities of AI use in education.

For students, generative AI offers the potential for immediate, personalised feedback with their request and order. However, students need to be aware of the limitations of AI feedback. While generative AI can provide useful feedback on lower order concerns, it may not be as effective in addressing higher order concerns that require a deeper understanding of context and nuance. Students also need to be critical consumers of AI feedback. They should understand that AI feedback is generated based on algorithms and currently may lack the depth and complexity of human feedback. Students should be encouraged to seek human feedback in addition to AI feedback, especially for complex tasks and higher order concerns. Moreover, students need to be aware of the risks associated with the use of AI in education, such as data privacy issues and the potential for algorithmic bias and plagiarism. It could be beneficial to pursue higher-order feedback to enhance personal learning, once the associated risks and ethical concerns have been accurately discerned.

8. Limitation and Future Recommendation

This study acknowledges that generative AI technology, including the GPT 4 released in March 2023, is at a nascent stage of its development. Whereas GPT 4 remains in active use as a foundational platform for AI advancements as of May 2023 during the research, the rapid progression of AI technology warrants consideration as the perspectives of educators and learners leveraging generative AI could transform with future technological evolution. Hence, the research attempts to investigate the nature of feedback generated by large language model AI in comparison to human feedback. The survey's implications maintain a long-term perspective beyond this ongoing technological evolution.

As suggested by Säljö (1996), there exists a gap between people's stated comprehension and their actual cognitive grasp. Consequently, the internal cognition of research participants is not the primary focus of this research. Instead, the paper intrigued how participants articulate their experience with the subject at hand and their insights into the process of comprehending it. I argue that even though the participants' descriptions do not provide an exhaustive representation of their understanding, they certainly illuminate how participants interpret a phenomenon or comprehend specific situations within a given context. Understanding the perspectives of students and educators is essential to optimise these systems and truly support student growth and development.

Regarding the participants' background, the survey involved undergraduate and postgraduate students from Sweden's internationally inclusive higher education system. This system attracts students from various regions, including other EU nations and Asia. Nevertheless, it is critical to acknowledge the potential omission of minority perspectives that may have been overlooked due to their non-participation in the survey, despite the respect for cultural and sexual diversity. Note that the cultural and experiential background of the researcher may include prejudices, values and ideologies (Chenail, 2014). From the educators' standpoint, the study primarily targeted professors with specialised knowledge in education and IT. Yet, the exploration of more diverse educators' perspectives could enhance the richness of the data. Furthermore, it's crucial to bear in mind that several statements in the interviews were made explicitly considering a specific service (ChatGPT by Open AI), which may limit the generalizability of the findings.

This research highlights the need for continuous development and improvement in the field of generative AI, especially in the context of education. While AI shows promise in providing immediate, general feedback, there are clear areas for growth. Future iterations of AI should aim to address higher order concerns more effectively, providing more nuanced and context-aware feedback. Furthermore, there is a need for AI to better emulate the emotional and relational aspects of human feedback. The findings also underscore the importance of a balanced approach in integrating AI into education. While AI can augment feedback provision, it cannot replace the holistic feedback provided by human educators. Policymakers, educational institutions, teachers, and students need to understand the strengths and limitations of AI and adopt strategies that maximise the benefits of both AI and human feedback. The integration of generative AI into education also raises ethical and privacy concerns that need to be addressed. Policymakers and educational institutions need to establish robust guidelines and policies to manage these risks, and all stakeholders need to foster an environment of critical thinking and risk awareness. As underscored by Trasusan-Matu et al. (2021), it is crucial for educators to possess profound insights into dialogism and those theoretical foundations in order to cultivate a planetary intelligence capable of addressing humanity's challenges in an ethical manner.

This research opens up several avenues for further investigation. Future studies could explore how AI can be developed to provide more nuanced, context-aware feedback, and how it can better emulate the emotional and relational aspects of human feedback. Research could also investigate how a balanced feedback system, integrating both AI and human feedback, can be implemented effectively in various educational settings. Additionally, further research could examine student and educators behaviours and attitudes towards AI feedback, and how these impact the effectiveness of feedback and learning

outcomes multimodal including ethnography and video methods. From a quantitative perspective, it is also valuable to explore their epistemology more statistically and closely using methods such as Epistemic Network Analysis. Other potential areas of investigation include the ethical and privacy implications of using AI in education, and strategies for managing these risks.

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Appendix 1: Focus Group Interview Questions

To initiate the conversation and create a comfortable atmosphere for the participants, the interviewer asked the following icebreaker question:

- How do you see your familiarity with Generative AI (e.g., ChatGPT or some other services) on a scale of 1 to 5? (1 being not familiar and 5 being very familiar)

Question 1: Comparing human and AI-generated feedback

According to Baidoo-Anu & Owusu (2023), generative AI such as ChatGPT can be used to provide personalised tutoring and interactive feedback based on students' individual learning needs and progress in a conversational manner. On the other hand, they might not be capable of providing the same level of human interaction as a real teacher or tutor (Baidoo-Anu & Owusu, 2023) :

- Can AI generate the same feedback as that produced by a human? If not, what is the difference between the two types?
- What contexts do you think AI-generated feedback could be effectively used? Where would it not work?

Question 2: Emotional responses to feedback in human and AI

Steen-Utheim & Wittek (2017) state that feedback can trigger a range of emotional responses, and emotions play a significant role in students' feedback experiences. Pre-survey suggested that people could have different emotional expectations of human and AI feedback, and that they also could feel different types of emotions in face-to-face and written feedback:

For educators:

- How do you deal with students' emotional responses to feedback?
- How do you think feedback using generative AI could affect students' emotional responses?
- How do you assess the difference? Positive or Negative?
- How would you yourself perceive the difference? If, for instance, you got a review on a paper you wrote – with good or bad critique – would it matter if it was produced by an AI or not?

For students:

- What are your feelings in relation to feedback produced by humans and AI?
- In terms of your emotions or experiences of the feedback, how do you understand the difference between the two?
- How do you assess the difference? What are the benefits and drawbacks?
- How would you yourself perceive the difference? If, for instance, you got a review on a paper you wrote – with good or bad critique – would it matter if it was produced by an AI or not?

Question 3: Ethical issues to use generative AI for feedback

According to Kasneci et al., (2023), large-scale language models can perpetuate and amplify existing prejudices and inequities in society, which can have a negative impact on teaching and learning processes and outcomes. Zhai (2022) also reports that bias, privacy and lack of transparency in generative AI for education could be ethical concerns. Mhlanga (2023) insists that it is essential to conduct an in-depth analysis and address the potential for discrimination and bias before introducing generative AI systems such as ChatGPT into education:

- What could be ethical issues to use generative AI for feedback?

- What should teachers/students know about giving/receiving feedback through generative AI?

Question 4: Integrating AI-generated feedback in human feedback

The final set of questions focused on the ideal balance between human and AI-generated feedback in higher education and explored strategies or practices that can ensure the effective integration of AI-generated feedback with human feedback to maximise learning outcomes:

- How do you see the ideal balance between human and AI-generated feedback in higher education?
- What strategies or practices can be implemented to ensure that AI-generated feedback is effectively integrated with human feedback to maximise learning outcomes?
- How can AI-generated feedback be tailored or customised to better suit individual needs and learning styles in higher education?

Appendix 2: Consent form

Consent form for taking part in the thesis work

The aim of this study is to investigate the potential and limitations of AI-generated feedback comparing it with human feedback in higher education. The findings of this research will contribute to a deeper understanding of the potential and limitations of AI-generated feedback in university teaching and inform the development of best practice in AI-enhanced feedback experiences.

By signing this consent form, you approve that your personal data is processed within the frame of the study described above. You can withdraw your consent at any time by contacting one of the contact persons below. In that case, your personal data will not be saved or processed any longer without other lawful basis.

The personal data that will be collected from you is your name, contact information and audio recordings from the focus group. Your personal data will be processed as part of the study, and after this the data will be archived on a password protected server.

You always have the right to request information about what has been registered about you and to comment on the processing of the data that has been collected by contacting one of the contact persons below or the higher education institution's personal data ombudsman on dataskyddsbud@gu.se. Complaints that cannot be solved in dialogue with the University of Gothenburg can be sent to the Swedish Authority for Privacy Protection.

Contact information:

Student's name: Bunichi Otaki

Student's email address

Supervisor's name: Oskar Lindwall

Supervisor's email address

I have received information about the study and have had the opportunity to ask questions. I get to keep the written information.

I agree to participate in the study "Exploring the perception of Human and AI-Generated Feedback in Higher Education: A Focus Group Study"

I agree to data about me being processed in the manner described in the information letter to the participants.

