The Role of Artificial Narrow Intelligence (ANI) in Early Childhood Education Students' Learning Experiences in a Mainstream Classroom

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ABSTRACT:

This phenomenological study explored the experiences of Early Childhood Education (ECE) students in higher education across Eastern Visayas regarding their engagement with Artificial Narrow Intelligence (ANI) in mainstream classroom settings. Focusing on perceptions, ethical and cultural challenges, and strategies for integrating AI with independent reasoning. The study was anchored in Cognitive Load Theory and framed within SDG 4 (Quality Education) and SDG 9 (Industry, Innovation, and Infrastructure). Twelve purposively selected participants engaged in Zoom focus group discussions, and data were analyzed using Colaizzi's descriptive phenomenological method. Findings revealed that students perceived ANI as a valuable tool for idea generation, knowledge acquisition, and decision-making, while challenges included overreliance, ethical concerns, and limited access. Coping strategies such as peer consultation, tech timeouts, and critical evaluation supported balanced use. The study concluded that guided ANI integration can enhance learning in inclusive mainstream classrooms, supporting comprehension and creativity, while unguided use may compromise critical thinking. Institutions should promote ethical, culturally aware, and structured AI use as a complementary learning support.

Keywords: Artificial Narrow Intelligence; Early Childhood Education Students; Mainstream Classroom; Inclusive Education; Learning Experiences.

INTRODUCTION

Artificial Narrow Intelligence (ANI) is now a widely used tool that supports the learning experiences of Early Childhood Education (ECE) students in mainstream classroom settings. Technology, particularly artificial intelligence, is used through grammar checkers, content generators, and summarizing tools to enhance productivity and understanding of context. These tools foster decision-making, critical thinking, and student management (Nabilla et al., 2024). Conversely, results revealed that some students showed an overreliance on these tools. The study was conducted to understand how ECE students perceived ANI's role in their learning experiences in

mainstream classrooms, the challenges they faced, and the coping strategies they employed to maintain a balance between technology and intellect.

This study directly contributed to SDG 4 (Quality Education) by promoting inclusive and equitable access to quality education through technological innovation. Additionally, SDG 9 (Industry, Innovation, and Infrastructure) underscores the importance of developing educational systems that are technologically adaptive yet human-centered (Nedungadi et al., 2024). In this context, the use of ANI demonstrated that innovation in education must enhance students' cognitive, ethical, and creative development while ensuring that technology remains a supportive—not substitutive—force in learning. The study was guided by Republic Act No. 10929 for digital access, CHED Memorandum Order No. 6 for flexible and AI-assisted learning (Gervacio, 2021), DepEd Order No. 29, s. 2022 for digital literacy, and the Data Privacy Act of 2012 for ethical technology use (Department of Education, 2022).

These frameworks collectively shaped the study's methodology and interpretation. In addition, this study was anchored in Cognitive Load Theory (CLT), developed by John Sweller (Sweller, 2020). The theory posits that human working memory has limited capacity, and learning becomes more effective when instructional materials are designed to manage cognitive load efficiently. This study contributed to a clearer understanding of how Early Childhood Education students interact with Artificial Narrow Intelligence (ANI) in mainstream classroom learning contexts. For students, the findings demonstrated that ANI functions both as a support and as a potential obstacle to academic performance. For educators and higher education administrators, the research offered insights into integrating technological tools into pedagogy while maintaining students' analytical, creative, and culturally grounded reasoning skills. For policymakers, the study provided empirical data to inform the development of guidelines for the adoption of Artificial Intelligence (AI) in educational settings. For future researchers, the results identified opportunities to further investigate the effects of AI on cognition, motivation, and independent learning within a culturally and ethically aware Philippine educational context.

Findings from the related literature supported the study's results. Previous researchers noted that ANI contributes to effective decision-making and learning efficiency, while Bean and Melzer (2021) emphasized the need for teacher supervision to prevent dependence on technology. Other studies highlighted the importance of developing AI literacy to help students recognize the limitations of AI tools. Locally, Abulibdeh et al. (2024) confirmed that although AI supports engagement and motivation, issues of accuracy, overreliance, and access remain. These findings paralleled those of students in Eastern Visayas, who viewed ANI as helpful yet imperfect, underscoring the need to balance technological reliance and human reasoning within cultural and ethical contexts.

Furthermore, this study explored the role of Artificial Narrow Intelligence (ANI) in shaping the learning experiences of Early Childhood Education students in mainstream classroom settings within higher education institutions in Eastern Visayas. It determined students' perceptions of ANI, the challenges they encountered in integrating ANI into learning, and the coping mechanisms they used to balance AI-assisted learning with independent academic reasoning. Artificial Narrow Intelligence shaped students' learning by enhancing creativity, efficiency, and decision-making. However, challenges such as dependence, inaccuracy, and limited access were noted. Students coped through digital detox, self-reflection, and critical engagement with other resources. The findings suggested that ANI should be a complementary tool that strengthens, not replaces, students' intellectual, creative, and culturally grounded abilities. The study affirmed that responsible ANI use supports national education policies and global sustainability goals, keeping future learning innovative, ethical, and human-centered.

METHODOLOGY

Research Design

The study employed a phenomenological research design to determine the role of Artificial Narrow Intelligence (ANI) in shaping the learning

experiences of Early Childhood Education students in mainstream classroom settings. This design allowed the researchers to capture students' perceptions, the benefits of ANI, ethical and cultural considerations, challenges, and coping mechanisms while reflecting on responsible, human-centered technology use. Interviews and narrative accounts provided insights into participants' experiences and common themes.

Research Locale

The study was conducted in three higher education institutions in Eastern Visayas offering undergraduate programs in Early Childhood Education for SY 2024–2025. These diverse academic environments allowed exploration of varied experiences and perspectives on how ANI is integrated into mainstream classroom learning while considering culturally and ethically informed practices.

Research Participants

Twelve purposively selected ECE students from the three institutions participated in Zoom focus group discussions. Participants were chosen based on inclusion criteria to ensure relevance and representation, with a validated semi-structured interview guide to explore perceptions, challenges, and coping strategies in using ANI. Snowball sampling was applied when multiple eligible students per year level were identified, ensuring a comprehensive view of ANI's impact on learning experiences in mainstream classrooms.

Ethical Considerations

The study observed ethical research standards to protect the rights, safety, privacy, and confidentiality of the Early Childhood Education students who participated in the study. Informed consent was obtained after the purpose, procedures, and nature of the study were explained, and participation was voluntary with the right to withdraw at any time without penalty. All data were kept confidential and used only for academic purposes while ensuring respectful, culturally sensitive, and human-centered engagement with Artificial Narrow Intelligence (ANI) in mainstream classroom learning.

Data Analysis

The data gathered from the Zoom focus group discussions were analyzed using Colaizzi's descriptive phenomenological method as cited by Shosha (2012). The researcher transcribed the discussions verbatim, repeatedly read the transcripts, extracted significant statements, formulated meanings, and organized them into thematic clusters. The findings were validated through participant checking to ensure that the results accurately reflected the Early Childhood Education students' perceptions, challenges, and coping mechanisms in using ANI in mainstream classroom settings.

Trustworthiness

Trustworthiness was ensured through careful transcription, repeated reading of transcripts, systematic analysis, and participant validation. Themes were drawn directly from participants' responses to accurately reflect their experiences. Confidentiality and ethical standards were observed to strengthen the credibility of the findings.

Reflexivity

The researcher followed the reflexivity by setting aside personal experiences and focusing only on the participants' responses. Personal biases were carefully bracketed during data analysis. This ensured that the findings reflected the students' authentic experiences with ANI in mainstream classroom learning.

RESULTS AND DISCUSSION

Perceptions of Early Childhood Education Students Toward ANI in Mainstream Classroom Learning

Based on the participants' narratives, the study determined the perceptions of Early Childhood Education students toward the role of Artificial Narrow Intelligence (ANI) in their learning experiences in mainstream classroom settings within higher education institutions in Eastern Visayas. Four themes emerged: ANI as a tool for guidance in decision-making, verification and accuracy, idea generation and suggestions, and enhancement of learning and knowledge.

Theme 1: Guidance in Decision-Making

The study found that Early Childhood Education students used Artificial Narrow Intelligence (ANI) as a supportive tool in making academic decisions within mainstream classroom learning. Participants shared that ANI helped guide various academic tasks, clarify concepts, generate ideas, and improve their performance while engaging with teacher-provided learning materials. These insights show that students were able to integrate ANI into their learning process while still emphasizing independent learning, critical thinking, ethical use, and human-centered academic practices (Seraji et al., 2025).

Significant response: "AI actually give ideas or guidance towards students because there are some, I admit that I'm one them that sometimes, that students that's perfect and attain everything at all so in using AI not just aaa… not just they rely solely" (AI provides guidance to students because not everyone is perfect—I admit, myself included. It's not just about relying on it entirely.) [P1, L55-59]

Theme 2: Verification and Accuracy

Students expressed that they used Artificial Narrow Intelligence (ANI) to check grammar, refine writing, and improve the clarity and correctness of academic outputs in mainstream classroom learning. The findings suggest that higher education institutions should provide training, learning materials, and seminar-workshops to help Early Childhood Education students understand both the advantages and limitations of ANI, particularly in verifying AI-generated content and using it ethically (Latif et al., 2023; Licardo & Lipovec, 2023). These measures can help ensure that ANI supports students' learning experiences while preserving critical thinking, human reasoning, creativity, and culturally grounded ethical values.

Significant response: "I used it on my checking my grammars because I've seen that AI is good tool for checking grammars especially on my essays" (I have used it to check my grammar because I have seen that AI is a good tool for checking grammar, especially for my essays.) [P9, L83-85)

Theme 3: Idea Generation and Suggestion

The study found that Early Childhood Education students benefit significantly from using Artificial Narrow Intelligence (ANI) for idea generation and enhancing their learning experiences in mainstream classroom settings. Students reported that ANI helps them brainstorm ideas, suggest solutions, and contribute to a more dynamic academic process while supporting creativity and cognitive development (Ghorbani, 2024). By reflecting on AI-generated suggestions, students are able to balance technological input with their own reasoning, maintaining ethically guided, culturally aware, and human-centered problem-solving practices that preserve intellectual autonomy. Below are some narratives shared by the participants:

Significant response: "They can utilize for their learning and with the help of AI we come up with ideas ahmm… presenting ideas nga that will hone their learnings" (They can utilize AI for their learning, and with its help, they can generate ideas that enhance their understanding.). [P1, L64-66]

Significant response: "I use AI Ma'am was kadtong ah… we have a reporting and summarize the learning materials that our professor gave us po. So to have a more examples Ma'am, nag ask po ko sa iya examples, scenario ing ato na subject" (I use AI for reporting and summarizing materials from our professor. I also ask for more examples and scenarios related to our subject.). [P7, L166-169]

Theme 4: Enhancing Learning and Knowledge

The study revealed that Early Childhood Education students in mainstream classroom settings used Artificial Narrow Intelligence (ANI) to enhance learning and deepen understanding without relying solely on AI. While ANI served as a helpful tool, students emphasized the importance of resourcefulness, critical thinking, and independent reasoning to complement AI-generated information, promoting engagement and improved problem-solving (Aymen & Zakarya, 2024; Elder & Paul, 2020). Findings highlighted that ANI should strengthen students' skills rather than replace the learning process, and proper guidance is necessary to ensure ethical, culturally informed, and human-centered use of AI in learning. This approach helps students develop intellectual, creative, and culturally

grounded abilities, preparing them for future professional challenges while maintaining autonomy and reflective thinking. Below are some highlights of the participants' responses:

Significant response: Artificial intelligence is that ahm…I myself I used AI to deepen my understanding about certain topics especially now here in college (Artificial intelligence is something I use to deepen my understanding of certain topics, especially now in college.). [P5, L116-118]

Challenges in Using ANI in Mainstream Classroom Learning

The participants shared the challenges they encountered while using Artificial Narrow Intelligence (ANI) in mainstream classroom learning. Three key themes emerged: AI dependency, accuracy and reliability concerns, and access and infrastructure limitations. These findings indicate that while ANI supports learning, its use can raise ethical, cultural, and human-centered concerns, particularly when students become overly reliant on technology instead of developing independent academic judgment.

Theme 1: AI Dependency

The study revealed that Early Childhood Education students in mainstream classroom settings have become increasingly reliant on Artificial Narrow Intelligence (ANI) in their learning. Many students reported waiting for AI-generated answers instead of actively engaging with the material, which limited critical thinking, problem-solving, and independent learning (Ajri, 2025; Holmes, 2020). Participants noted that excessive use of ANI can diminish creativity, resourcefulness, and ethical academic practices, while also impacting cultural values such as perseverance and responsible knowledge construction. Overreliance may further affect sustainability due to repeated and unnecessary use of AI tools (Lucci et al., 2022). These findings highlight the importance of guiding ECE students to use ANI as a supportive, rather than substitutive, tool, ensuring they develop intellectual autonomy, ethical decision-making, and culturally grounded learning habits. The participants shared their experiences:

Significant response: "Ahh… the challenges that I can think of is that, because of Artificial Intelligence, students become dependent ahhhmmm… they don't ahhh… mostly rely nalang po ha Artificial Intelligence" (The challenge I see is that, because of Artificial Intelligence, students become too dependent and mostly rely on it.). [P5, L289-291]

Significant response: "Ma'am, ahhh… accurate na challenges na akong naencounter using AI Ma'am earlier I have mention na due to reliance in AI, I procrastinate" (Ma'am, one accurate challenge I've encountered using AI is that, as I mentioned earlier, my reliance on it leads to procrastination.). [P7, L526-528]

Significant response: "Overuse of AI can be bad kay actually Ma'am, AI we have pros and cons naman, for those for using AI we gain more ideas of what we are trying to look for since AI is very powerful it can generate anything what we wanted to do" (Overusing AI can be bad. While it has pros and cons, it helps us generate ideas quickly, as it's a powerful tool.). [P3, L308-310]

Theme 2: Accuracy and Reliability Concerns

The study revealed that Early Childhood Education students in mainstream classroom settings were aware that some answers or ideas generated by Artificial Narrow Intelligence (ANI) may not always be accurate or reliable. This encouraged them to verify AI-generated content, practice critical evaluation, and avoid blindly accepting information as correct. These concerns highlight the need for responsible ANI use, where students balance technological support with their own reasoning, uphold academic integrity, and apply ethical and culturally grounded judgment in learning (Reem, 2022).

Significant response: "For me Ma'am, di ba paggamit naton han kailangan gud talaga hin internet so may mga student talaga na diri hira nakaka access" (For me, Ma'am, since we need internet access, there are students who really can't access it.). [P11, L326-329]

Theme 3: Access and Infrastructure Limitations

The study revealed that some Early Childhood Education students in mainstream classroom settings faced difficulties in using Artificial Narrow Intelligence (ANI) for learning due to poor or unstable internet connections.

Reliable internet access was essential for students to fully engage with ANI tools, and limited connectivity prevented some learners from maximizing AI-supported learning experiences. These access and infrastructure limitations reflect digital inequality, showing the need for higher education institutions to promote equitable, ethical, culturally sensitive, and human-centered ANI integration in mainstream classroom learning (Rahiem, 2020). Here are some of the participants' insights:

Significant response: "For me Ma'am, di ba paggamit naton han kailangan gud talaga hin internet so may mga student talaga na diri hira nakaka access" (For me, Ma'am, since we need internet access, there are students who really can't access it.). [P11, L326-329]

Coping Mechanisms Toward ANI in Mainstream Classroom Learning

The coping mechanisms shared by Early Childhood Education students highlight their ability to remain productive and engaged despite challenges posed by Artificial Narrow Intelligence (ANI). Key strategies such as tech timeouts, self-care resets, and peer consultation reflect how students balance technological use with cognitive, ethical, and culturally grounded learning practices in mainstream classroom settings. These approaches help maintain critical thinking, independent reasoning, and human-centered engagement with ANI.

Theme 1: Tech Timeout

The study revealed that Early Childhood Education students in mainstream classroom settings practiced tech timeout by taking intentional breaks from using Artificial Narrow Intelligence (ANI) tools. These breaks helped them reduce digital fatigue, regain focus, reflect on their learning, verify information, and avoid overreliance on AI-generated answers. This coping strategy supported mental wellness, ethical technology use, and culturally grounded problem-solving skills while encouraging students to engage actively with learning materials (Seaward, 2020). Here are some of the participants' insights:

Significant response 1: "So very common coping mechanism ko Ma'am, is if nauurit na po ako paggamit hit AI kay kun diri naasya it response I would usually turn off my phone" (My common coping mechanism, Ma'am, is if I get frustrated with using AI and it doesn't provide a response, I usually turn off my phone.). [P12, L340-345]

Significant response 2: "I would practice to not to use AI as much as possible" (I would practice not using AI as much as possible.). [P7, L528]

Theme 2: Self-care reset

The findings revealed that many Early Childhood Education students in mainstream classroom settings practiced a self-care reset to manage the cognitive and emotional demands of using Artificial Narrow Intelligence (ANI) in learning. Students reported listening to music to achieve calmness and relaxation, taking short naps to recharge, or enjoying favorite snacks and meals as ways to relieve frustration, particularly when AI-generated answers were incorrect. These strategies allowed them to clear their minds, regain focus, and sustain productivity while supporting mental wellness, ethical engagement with technology, and culturally grounded learning practices (Krouwel et al., 2023). By integrating self-care into their study routines, students were able to balance technological use with critical thinking, human-centered learning, and responsible decision-making, ensuring that ANI tools complemented rather than replaced their active engagement with academic materials. Here are the narratives of the participant:

Significant response 1: "Listening to music para mapakalma an akon mind (Listening to music helps calm my mind.). [P4, L568]

Significant response 2: "Usually I rest, I sleep and eat and you know I will not use the AI at the other kuan bagan diri na ngani ako maayon hi AI for that particular information" (Usually, I rest, sleep, and eat. I avoid using AI if I feel it's not providing the right information for that particular need.). [P9, L575-577]

Significant response 3: "Nakaon, namimiling po akon snacks parang namimiling po akon pagkaon nafefeel na hungry po ako everytinme na diri po asya it response" (I eat snacks, like I look for food, whenever I feel hungry, especially when I don't get a response.). [P12, L507-508]

Theme 3: Vent and Connect

The study revealed that Early Childhood Education students in mainstream classroom settings sometimes take breaks from using Artificial Narrow Intelligence (ANI) tools to focus on life outside technology and engage with peers, classmates, or mentors. By seeking alternative opinions and expert advice, students ensure that their answers are accurate, culturally appropriate, and ethically sound, fostering higher-order thinking, collaborative learning, and culturally grounded decision-making (Nikolic et al., 2023; Roy, 2024). This approach allows students to critically evaluate AI outputs, share frustrations, develop problem-solving strategies, and build resilience, ethical reasoning, and personal growth while maintaining human-centered and culturally sensitive engagement with learning materials.

Here are the narratives shared by the participants:

Significant response 1: "Huwag ka nalang magrely sa technology rather take ahhh…. like take a step

backwards for a while and live life slowly be connected with nature ahhmmm…. focus more on social interaction" (Don't just rely on technology; instead, take a step back for a while, live life slowly, connect with nature, and focus more on social interaction.). [P14, L543-546]

Significant response 2: "One thing na akon ginhihimo is nagrarant ako ha akon classmate na diri accurate an akon nakuha na AI information" (One thing I do is ask my classmate if the information I got from AI is accurate.). [P4, L569-570]

Significant response 3: "I talk and ask to those people who are knowledgeable so" (I talk to and ask people who are knowledgeable.). [P11, L590-591]

The study revealed that Early Childhood Education students in higher education institutions in Eastern Visayas perceive Artificial Narrow Intelligence (ANI) as a valuable tool in shaping their learning experiences in mainstream classroom settings. Students viewed ANI as helpful in supporting decision-making, verifying accuracy, generating ideas, and enhancing learning, while also recognizing the need for responsible, ethical, and culturally grounded use. They benefited from ANI in promoting creativity, efficiency, and knowledge acquisition; however, they also encountered challenges such as overreliance on AI, concerns about accuracy and reliability, and limited access due to technological and infrastructural constraints.

These findings highlight that ANI plays both a supportive and challenging role in the learning experiences of Early Childhood Education students in mainstream classrooms. To address these challenges, students employed coping mechanisms such as tech timeouts, self-care resets, and venting and connecting with peers or experts, which helped foster critical thinking, human-centered problem-solving, and culturally aware engagement with technology. Collectively, the findings suggest that ANI can enhance academic performance when integrated with pedagogical guidance, digital literacy, and culturally sensitive practices, while maintaining students' intellectual autonomy, ethical responsibility, and reflective engagement with both AI tools and broader learning communities.

Conclusion

This study concludes that Artificial Narrow Intelligence (ANI) plays an important role in shaping the learning experiences of Early Childhood Education students in mainstream classroom settings within higher education institutions in Eastern Visayas. Students perceived ANI as a valuable educational tool that supports decision-making, accuracy verification, idea generation, and overall learning. While ANI promotes creativity, efficiency, and knowledge acquisition, students also experienced challenges such as overreliance on AI, concerns about the accuracy and reliability of information, and limited access due to technological and infrastructural constraints.

These challenges highlight the ethical, cultural, and environmental considerations associated with ANI integration in mainstream classroom learning. To address these issues, students employed coping mechanisms such as tech timeouts, self-care resets, and venting and connecting with peers or experts, which fostered critical thinking, human-centered problem-solving, and culturally sensitive engagement with

technology. Collectively, the findings underscore that ANI can significantly enhance learning when integrated alongside pedagogical guidance, AI literacy, and culturally aware practices.

Recommendations

Higher education institutions should provide comprehensive training and orientation programs to promote the responsible, ethical, and culturally informed use of Artificial Narrow Intelligence (ANI) tools, equipping Early Childhood Education students with the skills to critically evaluate, verify, and appropriately apply AI-generated information in mainstream classroom learning. Educators are encouraged to integrate AI literacy, critical thinking, and reflective activities into the curriculum, while policymakers and administrators should establish clear institutional guidelines aligned with national laws, data privacy standards, and ethical frameworks to ensure safe, equitable, and culturally sensitive AI use.

Students should practice balance, self-regulation, and reflective engagement by using ANI as a supportive tool while strengthening independent learning, creativity, problem-solving abilities, and culturally grounded decision-making. Additionally, fostering collaborative learning, peer consultation, and community engagement can help students critically assess AI outputs, embrace diverse perspectives, and reinforce ethical and human-centered practices, ensuring that technology complements rather than replaces their intellectual, creative, and culturally informed development.

Conflict of Interest

The researcher declares that there is no conflict of interest in this study, and no personal, financial, professional, or institutional benefit influenced the research process. All procedures, analyses, and conclusions were carried out objectively and independently, maintaining the integrity and credibility of the study.

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This research did not receive any external funding, and all expenses were shouldered by the researcher. The absence of funding did not affect the design, implementation, analysis, or reporting, ensuring that the findings and conclusions remained unbiased and academically sound.

Use of Artificial Intelligence

The researcher acknowledges using AI tools, such as ChatGPT and Grammarly, solely to improve sentence construction, grammar, clarity, and readability. All ideas, analyses, and interpretations remain the work of the researcher, with AI use not affecting originality, intellectual contribution, or academic responsibility.

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