Preparing Autistic Students for the AI Workforce

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Abstract

Software project courses too often focus instruction on technical skills but leave necessary communication and teamwork skills as an exercise for the learner. When autistic students take these courses, they often find difficulty fitting into teams with non-autistic students because of their different styles of communication. To explore how to help autistic students adapt to non-autistic normative software engineering environments, we designed and taught a first-of-its-kind online project course on AI, explicitly teaching communication and teamwork skills with purposefully designed scaffolds. After the course, students were matched with professional, online summer internships in which they could apply the skills they learned. We detail the course structure, including the pedagogical strategies employed and the specific challenges encountered. Our experiences reveal key elements that contributed to the course's success, such as the importance of adaptive teaching methods and the need for carefully considered instructor training for teaching neurodivergent learners in software engineering. We share this report to provide guidance for educators, researchers, and advocates seeking to develop effective computing education programs that include autistic students.

CCS Concepts

• **Social and professional topics** → **People with disabilities**; • **Human-centered computing** → Collaborative and social computing; **Accessibility**.

Keywords

autism, software engineering education, computing education, project courses, artificial intelligence

FSE Companion '25, Trondheim, Norway

ACM ISBN 979-8-4007-1276-0/2025/06
https://doi.org/10.1145/3696630.3727233

ACM Reference Format:
JiWoong (Joon) Jang, Ren Butler, Rory McDaniel, Aidan San, D. Matthew Boyer, Somayeh Asadi, Richard Kubina Jr., Taniya Mishra, and Andrew Begel. 2025. Preparing Autistic Students for the AI Workforce. In *33rd ACM International Conference on the Foundations of Software Engineering (FSE Companion '25), June 23–28, 2025, Trondheim, Norway.* ACM, New York, NY, USA, 12 pages. https://doi.org/10.1145/3696630.3727233

1 Introduction

In software engineering project courses, the primary focus is often on developing technical skills, with students working individually or in small groups to design, implement, and deliver a software product. While this approach can be effective for many students, it often neglects essential communication and teamwork skills that are critical for success in professional software development environments [8, 29]. A typical project course curriculum may cover and include activities for mastering topics like programming languages, algorithms, data structures, and software design patterns, but with communication skills related to collaboration, conflict resolution, and effective communication left as implied learning goals.

To effectively bridge this gap and enhance educational outcomes, incorporating learning-by-doing and experiential learning becomes imperative. These principles, which are integral to learning science and software engineering education, have been widely adopted in higher education to increase both student engagement and the transfer of skills between the classroom and the workplace [30, 47]. Such evidence-based learning methods are particularly crucial for underserved student populations, who are disproportionately represented in community colleges—institutions that receive the fewest financial resources per student despite serving those with the greatest needs [18].

This resource disparity is especially concerning given that community colleges serve as a major gateway to continued education for autistic students. Of autistic students who continue their education, 70% attended a 2-year college at some point [44]. However, despite their academic capabilities, only 38.8% of autistic post-secondary students complete their degrees [38]. The navigation of social skills implicit in academic endeavors challenges their efforts in education and career pursuits [14]. As such, addressing these unique challenges can play a pivotal role in supporting their educational journey.

To begin to address these challenges, we designed a five-week project course teaching Artificial Intelligence (AI) engineering to autistic community college students that explicitly integrated both technical and communication learning goals. Our approach utilized scaffolding - a method of organizing instruction into smaller, more manageable chunks [11] - to structure technical and communication activities learning goals in preparation for post-course internships [19]. The course, administered from June to July 2024, enrolled 16 students, with 13 successfully completing the course and 12 securing internships in machine learning-related fields.

This experience report details the course design, learning goals, and pedagogical strategies, while sharing insights from both students and instructors. We particularly focus on successful practices and autism-related pedagogical lessons learned while designing and teaching this course, which we believe will be valuable for others developing programs for autistic students. Our findings suggest that adaptive teaching methods and carefully considered instructor training are crucial elements for accommodating neurodivergent learners in software engineering.

2 Background

2.1 Autistic Students in Computing

Autistic individuals have talents that are well suited to help meet the growing demand for software engineering talent. Autism is a lifelong neurological condition that affects an individual's communication and social abilities, along with restricted and repetitive behavior, interests, or activities [2]. There are over five million autistic adults in the United States of America [51]. During the next decade, up to 1.1 million young autistic people are expected to turn 18 and age out of the services provided under the federal Individuals with Disabilities Act (IDEA) [12]. 50% of autistic individuals lack an intellectual disability (possess average or above average intelligence); 16% will choose a field related to computer science [51]. This suggests that a large group of autistic adults will enter the job market and postsecondary education.

Autistic students entering computer science without intellectual disabilities demonstrate an aptitude for technical skills in software engineering. These aptitudes include attention to detail, high level of focus, comfort with repetitive tasks, and ability to visualize problems [4–6, 36]. These aptitudes align with programming-centered attributes associated with great software engineers and products by Li et al. [33]. Despite the strengths of autistic people in software engineering, autistic people face considerable challenges in education and employment. Autistic people experience an 85% rate of unemployment and underemployment in the United States due to social stigma [44]. The unemployment rate for autistic people is significantly higher than in any other disability group, including learning disabilities, intellectual disabilities, or speech-language impairment (47% for other disability groups) [12]. Challenges in communication and social stigma challenge autistic students' advancement in education and employment. For example, Cage and McManemy found that autistic students experienced higher rates of burnout and mental health symptoms and were more likely to consider dropping out of college [14].

We consider the strengths, challenges, and promise of autistic students in software engineering education and employment. Given previous work, we focus on the need for software engineering pedagogy that better supports the cognitive styles and talents of autistic students.

2.2 Communication is Essential in Software Engineering Project Courses

Communication is an essential soft skill for students in software engineering [25, 40, 46]. Soft skills are usually under-taught in software engineering and computer science courses, despite their importance. Educators and trainers in software engineering recognize the need for graduates to possess robust communication skills applicable in real-world scenarios [1, 9, 52]. Universities often attempt to equip their students with these skills by either mandating that Computer Science and/or Software Engineering (CS/SE) students enroll in communication courses conducted by another department or labeling specific SE courses as communication-intensive. However, neither of these methods has satisfied the calls for more efficient ways to prepare students for communication on SE topics within real-world professional contexts [29].

There is much previous work investigating software engineering pedagogy for communication and collaboration in four-year colleges and universities [8, 10, 23, 26, 27, 39, 42, 48, 49]. For example, VanDeGrift found that students perceive benefits in pair programming, such as less frustration and less workload [49]. Furthermore, Hundhausen [26] found that participation in social network-style activity streams was positively correlated with students' grades. These studies demonstrate the growing research agenda of supporting software engineering communication. However, we find little research investigating the implementation of software engineering communication pedagogy in 2-year institutions. Community colleges operate with significantly fewer resources for core academic and student support functions than public four-year institutions [18]. This disparity in resources can translate into less capacity to implement new pedagogy as student and industry needs evolve. In addition, many community college students are not 18-21 years old, but instead are returning to school for upskilling or reskilling after becoming dissatisfied with their previous careers. They may have had poor experiences with discrimination and stigma against the differences in their communication and cognition styles which lead them to be apprehensive about opening up in an educational setting. The lack of explicit instruction and scaffolding for communication and collaboration practices creates additional barriers for autistic students. Software engineering courses tend to involve projects that rely on communication and collaboration between students, such as pair programming [49, 53] and stand-up meetings [35].

This practice mirrors real-world software engineering practice. These communication practices tend to be implicitly adopted by allistic students (students without autism) [2]. Autistic individuals have difficulty appreciating non-autistic social rules by observation. The Double Empathy Problem is a theory that refers to mutual challenges in communication and understanding that occur when individuals from different neurotypes, such as autistic and allistic individuals, interact with each other [34]. In software development, autistic people tend to prefer events that are less dynamically flowing, less ambiguous, and slower paced [36]. Previous studies have suggested setting communication ground rules to mitigate these issues and using videoconferencing mechanisms to build trust among team members [45, 54]. This practice benefits autistic individuals as they do well when they can co-create a set of social meeting rules agreed upon by everyone in advance [54]. Thus, we create an educational experience tailored to the needs and preferences of autistic students by explicitly teaching communication and collaboration skills for software development through videoconferencing.

2.3 Universal Design for Learning Supports Inclusive Curricular Design

Universal Design for Learning (UDL) encompasses principles that recognize that traditional curriculum may not serve the learning preferences and needs of less traditional learners (e.g., autistic students) [11, 22]. UDL is based on the idea that rather than retroactively adjusting instruction that may be inaccessible to certain students, teachers should proactively design instruction to be engaging and accessible to a wide range of users from inception. UDL is grounded in three fundamental principles derived from cognitive science research: (a) providing various ways for students to *engage* with the material, (b) offering multiple *representations* of content, and (c) enabling a variety of methods for students to *act on and express* their knowledge [28]. Each of these principles is detailed by three guidelines, and supported by checkpoints that illustrate their application to instructional planning. When considered collectively, these principles, guidelines, and checkpoints assist educators in enhancing access and engagement in the objectives, strategies, resources, and evaluations used in teaching.

Previous work has explored the benefits of UDL in computing education [24, 37]. For example, Moster et al found that UDL guidelines such as providing scaffolded (well-structured) instructions helped to increase self-efficacy in communication skills among autistic students [37]. UDL offers strategies to facilitate universally beneficial implementation, such as fostering collaboration, scaffolding, offering real-world experiences, and creating outcomes that address varying learning preferences. An environment designed to suit and understand the needs of autistic people can benefit all students. If instruction allows autistic students to communicate and collaborate effectively, allistic students can learn from the strengths and communication styles of autistic students. We implement universal design principles to respect the diverse learning preferences of autistic students. To further assess the efficacy of implementations of universal learning design, it is imperative to identify the strengths and weaknesses of certain implementations in a variety of contexts. While [24, 37] apply universal design for learning for autistic students at the K-12 level, we investigate the effectiveness of UDL principles at the the implementations of UDL at the community college level.

3 Positionality Statement

Several of the instructors and authors of this work identify as neurodivergent, including one instructor-author who identifies as autistic. Our experiences as neurodivergent individuals in software engineering and computer science education deeply inform our approach to course design and instruction and motivate our commitment to developing more inclusive learning environments for autistic students. In particular, we share that the perspectives of our autistic instructor-author were integral to anticipating student needs and responses, and helped design and prioritize psychologically safe learning environments for our students.

4 Curricular Details

This section provides an overview of our course design, learning goals, and examples of activities to prepare autistic students for success in both technical and communication competencies.

4.1 Learning Goals

4.1.1 Technical Learning Goals. In this course, students were taught a comprehensive curriculum in Artificial Intelligence (AI) that covered a wide range of topics, including programming fundamentals (e.g., Python and Pandas for data manipulation and analysis), machine learning pipeline fundamentals (e.g., data collection, curation, and cleaning), and advanced AI topics including machine learning and deep learning concepts (*e.g., neural networks (NNs), convolutional neural networks (CNNs), loss & activation functions, optimization, over & underfitting, and regularization*). Additionally, it included instruction in AI ethics principles and concepts such as generative AI and Large Language Models (LLMs). By the end of the course, students were expected to demonstrate a concrete understanding of these technical concepts by successfully completing a final project that applied these skills to real-world scenarios. These curricular topics were selected because we believe they provide a foundation for understanding emerging trends in AI while aligning strongly with the current demands of AI-related technical internships.

4.1.2 Communication Learning Goals. Alongside technical skills, our course emphasized the development of communication and teamwork skills, which are essential for working effectively as part of a professional AI or software engineering team. Students practiced a wide range of communication tasks, such as creating and negotiating team preferences, developing team contracts, brainstorming ideas, reading and writing project specifications, conducting standup meetings, writing and presenting status reports, pair programming and mobbing, giving and receiving feedback, and presenting their work orally and in written form. These activities were integrated seamlessly into the technical curriculum to ensure they aligned with students' learning context.

The specific communication competencies were inspired by prior research in computer science education, including Carter et al. [16], Burge et al. [13], and Begel and Simon [8, 10], which highlight the importance of explicitly addressing the gaps in teamwork and communication preparation for software engineering students. To ensure student engagement, we intentionally embedded these goals into technical activities, making communication skills more actionable and more palatable to students who often undervalue soft skills.

We present the full array of communication learning goals covered in the course in Table 1, organized across core competencies such as reading, writing, speaking, listening, and teamwork.

Communication Areas of Focus and Goals				
Reading	**Writing**	**Speaking**	**Listening**	**Teaming**
Open-ended research	Structuring a persuasive argument	Presenting a persuasive argument	Receiving feedback	Navigating social boundaries and power dynamics
Reading specifications	Conflict resolution	Conflict resolution	Listening to others' presentations	Delegation
Reading documentation	Outlining / Documenting information	Self-advocacy	Identifying others' positions in a group	Negotiating norms
	Preparing presentation scripts	Asking germane questions		Leadership / Leading
		Asking for help		Forming collective agreement
				Mobbing

Table 1: We developed the communication-related part of the curriculum around the five areas of focus, and outlined relevant goals and skills for each area – each became the focus for a communication-related activity for the course.

4.2 Design and Curricular Activities

While most activities inherently addressed elements of the communication learning goals, others were more explicitly scaffolded to ensure students could progress in essential communication competencies while engaging with technical content.

Listening, Speaking, and Writing Feedback. To train students in providing and receiving feedback, we developed activities designed to foster clear and constructive communication skills. In a "Giving Feedback" exercise, students practiced providing critiques and suggestions in a way that remains constructive and focused on improvement. Importantly, an instructor demonstrated this process to students by delivering an intentionally suboptimal presentation, upon which students were encouraged to provide frank critiques toward the instructor instead as if they were a peer, modeling a low-stakes environment for students to practice giving feedback. In an accompanying "Receiving Feedback" exercise, students learned how to listen actively and thoughtfully respond to critiques offered by peers, building resiliency and interpersonal skills critical for professional teamwork.

Teaming and Collaboration. We implemented several exercises to scaffold teamwork and group dynamics. For example, a "Team Contract" activity trained students in collaboratively defining roles and responsibilities off a shared template. This was followed by establishing team members' communication preferences, including voice, synchronously text, or asynchronously text-based methods. These scaffolds culminated in "Final Project Ideas Negotiation" sessions where teams worked as a group to find consensus on an idea their final project. Throughout the course, instructors provided guidance while allowing students the agency to practice managing their team dynamics.

Presenting. To prepare students for professional presentation scenarios, we provided multiple opportunities for practice through structured activities. This included a live demonstration by an instructor creating a presentation from scratch to model the process, followed by student-led presentations on early group projects. Students then worked toward their Final Project Presentation, with intermediate steps that included mock presentations and iterative feedback sessions to refine content and delivery skills.

4.2.1 Integrated Activities: An Example. One standout example of integrated activities was a "How to Train Your Classifier" team-based competition. This activity combined technical and communication objectives by tasking groups of five to improve a pre-existing TensorFlow-based machine learning classifier. Working within shared Jupyter notebooks, teams adjusted parameters such as the number of neurons, layers, and optimization settings to minimize classification loss. Teams had to communicate suggestions effectively, decide on changes collaboratively, and implement them through a designated "point person" who managed the notebook. By pairing technical problem-solving with structured teamwork, the activity reinforced both technical and communication learning goals. We describe this activity in more detail in Section 5.2.3.

Instructor Preparation. To effectively deliver this course to autistic learners, instructors underwent two workshops with a speech and language pathologists (SLPs) focused on understanding neurodiversity and effective teaching practices. This first workshop helped provide insights into the educational needs of neurodivergent learners and practical advice for designing communication-focused activities. An additional workshop facilitated by a different speech and language pathologist (SLP) prepared instructors to better understand autistic perspectives and manage diverse communication preferences. During the course, instructors received ongoing feedback from this SLP to address emergent challenges such as those documented in Section 5.3.

4.3 Student Experience

4.3.1 Routine. To reduce stress and build predictability, the course followed a consistent daily and weekly schedule with an expected engagement time of 4 hours synchronously and 1.5 hours asynchronously. Each synchronous session consisted of announcements, project group time, technical lectures/activities (§ 4.1.1), communication activities (§ 4.1.2), and speaker sessions. Weekly events included individual meetings, surveys, and structured reflection times.

4.3.2 Progress Evaluation. Student evaluations for the course were structured to support both learning and skill development in a formative manner. Daily homework assignments were provided to introduce new concepts and reinforce previously covered technical material. These assignments were graded by the instructors for completion, and feedback was focused primarily on conceptual understanding rather than strict technical accuracy. When appropriate, general feedback and clarification regarding homework were given to the entire class to address common questions or misconceptions.

Instructors conducted informal assessments of students' demonstrated work in assignments and class activities. These assessments focused on evaluating whether students demonstrated sufficient technical skills and communication abilities to succeed in an internship environment. Finally, students were determined to have matriculated from the course if they completed all course material and substantially participated in the final group project activity.

4.3.3 Platforms. The course utilized a range of platforms to support its hybrid learning design, including Zoom for synchronous instruction, Discord for communication and group discussions, GitHub Classrooms for management of classroom materials, and Google Colab for running provided Jupyter notebooks for coursework.

5 Results

Sixteen students were selected for enrollment into our program. Students were asked to submit academic transcripts, recommendation letters (optional), and responses to questions inquiring about the students' interest and familiarity in AI. Overall, 13 out of 16 students completed the course. Two students were not considered by the instructors to have demonstrated sufficient conceptual mastery, while one student was removed from the course for repeatedly submitting materials that were determined to be generated by a large language model (LLM) despite prohibitions from doing so on course assignments.

5.1 Student Demographics

We share the following demographics about the students who participated in our course in Table 2. We note that all students enrolled in the program identified as autistic individuals with low or medium support needs, with the majority having low support needs. The course was facilitated by three instructors, who each directly oversaw a team of 5-6 students for group activities. To provide a consistent working environment for students, the same instructors mentored each team through both curricular exercises and the final project.

Total		**16**
Educational Background		
	First-Generation at College	4
	Attending Community College	6
Yrs in Tertiary Education		
	≤ 2	5
	≤ 4	5
	> 5	6
Gender		
	Male	8
	Female	4
	Non-binary	3
	Genderfluid	1
Race		
	White/Caucasian	10
	Asian	4
	Native Hawaiian/Pacific Islander	1
	Black/African American	1
	Decline to State	1
Age		
	18-21 years	8
	22-36 years	8
Neurodivergent Conditions	(more than one may apply)	
	Autistic	16
	Asperger's	3
	ADHD	10
	Dysgraphia	2
	OCD	2
	Social Anxiety	1
	Misophonia	1

Table 2: Student Demographics for our summer course in AI and communications skills

5.2 Preliminary Insights and Student Experiences from the Course

We report on some of the insights, outcomes, and anecdotes regarding student experience and learning from the course.

5.2.1 Increased Self-Efficacy with AI and Coding Practices. In post-course surveys ($n = 15$), student responses reflected students' newfound perceived proficiency with AI and general software engineering practices. The large majority (14; 93%) of students felt they had a "better" understanding of AI, Machine Learning, and AI Ethics since taking the class, with one student giving a neutral or negative response. Encouragingly, ten (10; 67%) students believed they had a "much better" understanding in AI, demonstrating many students' strong belief that the course enhanced students' AI knowledge.

While the focus was on AI fundamentals, the curriculum was designed to encourage development of general software engineering practices, such as looking up documentation for new tools and libraries. Students' feedback suggested that this too was effective in building self-efficacy in coding practices relating to AI:

> *I think the most helpful content for me was learning about what tools exist, how to use them, prompt engineering, and ethics. I think most CS jobs are going to leverage AI to produce faster or better work, so I feel much better about my understanding and ability to use AI models.*

5.2.2 *Practicing Communication Skills Yielded Durable Gains.*
Our course provided a structured environment for students to develop and practice communication skills typically overlooked in traditional educational environments [19, 29]. We share the following examples to illustrate how these structured practice opportunities contributed to students' post-course experiences.

Scaffolded Self-Introduction Practice. We implemented a gradual approach to developing self-introduction skills, which can sometimes be challenging for autistic individuals [14]. Students practiced introducing themselves daily at the beginning of class within their established project groups, creating a safe, consistent, and familiar environment. The practice followed a steady progression: beginning with highly structured introductions (name, college, major), then gradually incorporating more personal elements such as hobbies and special interests, and finally evolving toward workplace-appropriate presentations as internship interviews approached. This scaffolded approach allowed students to build confidence incrementally while developing professional communication skills. The durability of this intervention was evidenced when, several months after the course, messaged an instructor:

> *I've given so many 30 second intros in the last three days. I think I made a lot of good impressions at [the conference] this year. After all the practice I got this summer, doing my intros here felt like riding a bike.*

Interview Preparation. All students were expected to conduct interviews with the organizations we partnered with to offer them summer internships. As the Autism at Work Playbook [3] advises to reduce autistic each candidate's stress and anxiety about the interview process, we conducted "mock" interviews with our participants. These interviews provided them the opportunity to practice conducting a real-world interview, build their confidence, improve their communication skills, and reflect on their career goals. We asked participants to answer questions with the STAR method (Situation, Task, Action, Result) [15, 31], in which they could create narratives around past work situations that were challenging for them, reflect on their strengths in decision-making, teamwork, and leadership skills along with areas for growth, and explain their career goals in AI. Additionally, practicing how to talk about how being an autistic person influenced their career aspirations let them talk plainly about the elephant in the room, especially in interviews with hiring managers inexperienced with autism.[1] Participants provided insightful feedback on how the mock interview helped them improve their ability to gain confidence in discussing their strengths, challenges, and decision-making processes. Several students reported to us that they felt like this exercise greatly helped their preparation toward interviewing, feeling more empowered as they prepared to transition after the course. This perception by students was bolstered by their success in finding an internship after the course

[1]All intern managers were offered the services of an executive function job coach specializing in working with autistic tech workers to ensure they had the knowledge and support they needed to effectively manage their autistic intern.

5.2.3 *Successes when Mixing Technical and Communication Goals.*
We experienced outsized amounts of engagement with learning gains and engagement when we deployed activities which integrated both technical and communication goals. We detail one such activity here.

Classifier Training Competition. One of the most successful moments in the course emerged through a team-based classification model competition. This activity demonstrated how carefully structured integration of technical and communication objectives can create effective learning opportunities for autistic students in computing education.

Activity Structure: Teams of five students were tasked with improving a deliberately underperforming classifier model. The activity built directly upon the previous day's technical content on train/test loss and concepts of over/underfitting, requiring students to apply these concepts in a practical context. Each team operated in a "mob programming" format, with a pre-selected team lead responsible for implementing suggestions from team members. Team leads were specifically chosen by instructors based on their demonstrated ability to manage multiple tasks at once: processing peer suggestions, implementing code changes, and coordinating group communication.

Technical and Communication Goal Integration: The activity's design intentionally balanced the application of multiple skills. On the technical side, students engaged in model architecture design, hyperparameter tuning, and training optimization. Communication skills were equally emphasized, with students practicing articulation of technical suggestions, participating in group decision-making, and collaboratively solving problems. Teaming skills were fostered through the mob programming structure and through forming collective agreements during the activity.

Student Engagement: This activity achieved notably high engagement levels across all participating students. The low-stakes competitive element provided natural motivation for communication, while the technical challenge gave purpose and structure to team interactions. This structured environment appeared to reduce typical barriers to participation observed in other activities.

Implementation Considerations While this activity proved successful, it demanded substantial instructor resources, requiring both careful advance planning among teaching staff and active facilitation during the session. A critical element of preparation was the selection of team leads: instructors specifically chose students who demonstrated both technical competence and facilitation skills, who could implement suggestions without dominating the discussion, and who could effectively manage group dynamics.

5.2.4 *Building Student Confidence and Sense of Belonging in AI and STEM.*
We evidenced that this course not only improved students' perceived technical and communication skills but also enhanced self-efficacy and instilled a sense of belonging in AI and STEM fields. Many students reported building confidence through explicitly practicing social skills. One student shared:

> *I was always told to get over it and was pushed into being put into uncomfortable [social] situations without much support. Being able to practice communicating, being given tips on how to behave in certain situations (like how to approach your mentor for help, giving feedback), and how to advocate for my neurodiversity [is] a lifechanger.*

This sentiment was echoed by others when it came to teamwork. Several students shared in post-course interviews that the experience of working in an all-autistic team and collectively building AI-enabled tools to be "amazing" or "transformative".

The impact extended beyond immediate course outcomes to influence students' broader career aspirations – students frequently mentioned feeling more confident about pursuing careers in AI and technology. In a post-course survey, fourteen (14; 93%) out of fifteen students agreed that their "educational and career goals have become more focused since being part of this program," while ten students continued to express interest in pursuing "a career in AI."

The combination of technical skill development, structured social support, and peer collaboration appears to have created a powerful framework for building both competence and confidence. This aligns with research suggesting that sense of belonging is a crucial factor in STEM retention for underrepresented groups [51], while extending these findings to autistic learners specifically. We believe that the successful transition of many of our students into technical internships (as discussed in Section 5.4) validates our approach to addressing both technical and communication skills and providing scaffolded opportunities to practice both types of skills. These outcomes suggest that addressing both technical competency and social-emotional needs may be crucial for properly supporting autistic students' entry into technical careers.

5.3 Pedagogical Challenges and Adaptations

Our experience implementing this course revealed the need for continuous challenges and adaptations to better serve autistic learners, which we share.

5.3.1 Variable Integration of Technical and Communication Goals. While software engineering curricula traditionally separate technical content from communication skills development [8, 29], our experience confirms the notion that this separation may be problematic for autistic learners. Our course design made use of a natural experiment through three distinct instructional approaches: days focused solely on technical *xor* communication skills, days containing both technical and communication content as discrete components, and days with integrated activities combining technical content and communication skills practice. This variation in instructional design revealed the following observations.

Technical Only. In sessions focused purely on technical content delivery, most were through traditional lecture formats (often augmented with slides, live-coding and technical demonstrations, and where questions during lecture were encouraged). In these instances, instructors frequently encountered difficulty in assessing student engagement and comprehension, and many of the students revealed apprehensions on demonstrating their knowledge or current understanding to instructors and their peers (more explanation in § 6.2).

Communication Only. Instructors noted that students who approached the course with the expectation of acquiring technical skills questioned the need for communication exercises. Others expressed uncertainty as to the how the communication content was relevant to AI skills, overall echoing experiences from traditional software engineering courses where communication skills are often treated as peripheral [8, 29]. These questions remained despite reassurances and demonstrations by instructors about the importance of communication skills in contexts involving technical AI skills.

5.3.2 Variance and Asymmetry in Communication. Throughout the course, we observed significant variation in students' communication preferences and capabilities, creating complex dynamics in both instructional delivery and peer interactions. Students demonstrated varying preferences in communication modalities (video and voice on, video off with voice on, or text-only) and processing speeds, which significantly impacted group interactions and participation patterns.

Processing Speed Differences. Processing speed variations created notable tensions in synchronous group discussions. Some students required extended time to formulate responses while others processed and responded quickly, occasionally leading to participation imbalances. These differences often resulted in faster-processing students dominating discussions while others struggled to contribute at their preferred pace.

Communication Modality Preferences. Communication preferences varied widely among students, with some readily engaging in verbal discussion while others strongly preferred text-based communication through the course's Discord server. These differences occasionally led to communication breakdowns during group work, particularly when verbally communicating students waited for responses from students who preferred non-verbal communication.

Mid-Course Interventions. We recognized, we implemented several strategies to address these communication asymmetries within the first few days of the course:

- On a daily basis, we reiterated our hope that students would use verbal communication when possible, citing typical internship expectations for synchronous voice-based communication, and the importance of practicing these skills.
- We formed final project groups based on communication preferences, including a dedicated group for students who consistently demonstrated non-speaking preferences.

We note that this emphasis on verbal communication and group assignment helped with overall communication, however, several students still would inform instructors that they needed to go "text-only" on occasion. This reluctance appeared connected to emotional dysregulation issues (discussed in § 5.3.3), suggesting that simple encouragement without addressing underlying social-emotional barriers may only serve as a partial solution.

5.3.3 Emotional Dysregulation. There is significant co-occurrence of autism and mental health conditions, including anxiety, attention-deficit hyperactivity disorder (ADHD), among others [32, 43]. Indeed, we observed the apparent effects of these conditions in our students which significantly impacted their experience. Many students exhibited signs of heightened social anxiety and each student came into the course with different individual experiences of marginalization in prior classroom environments, which manifested through reluctance to seek help and engage with curricular material, and in one case outright conflict. We share some of the stories and our experiences here.

Social Anxiety, Rejection Sensitive Dysphoria, and Imposter Syndrome. Social anxiety emerged as a significant challenge throughout the course, manifesting in ways that were more varied than initially anticipated. Before the course, we attempted to mitigate social anxiety by asking students whether they considered themselves socially anxious. For those who self-identified as such, we provided accommodations such as allowing presentations to be submitted as pre-recorded videos – an adjustment designed to give students adequate time and privacy to prepare their responses in a way that reduced anxiety. However, we observed social anxiety impacting participation in less anticipated ways. One prominent example was how students responded during technical Q&A activities, where they were encouraged to contribute in a group chat or message an instructor privately. Even when given the option to send private responses, many students chose not to participate unless directly prompted. When they did respond, some students were observed changing their answers after seeing peers' contributions in the group chat, suggesting a pervasive fear of being incorrect or perceived as incorrect (Rejection Sensitive Dysphoria or RSD). This pattern of apparent RSD indicated hesitancy to participate in discussions unless students were highly confident in their answers, which appeared as anxiety over social judgment or perceived inadequacy.

Additional manifestations of social anxiety were observed during live interactions, particularly in groupwork. In moments of heightened overwhelm, students often disabled their cameras or microphones, which, while understandable, occasionally hindered timely progress in scheduled activities that depended on active collaboration. This disengagement was often a response to the combined pressures of social interaction and the cognitive load of processing technical information in a real-time classroom environment. Impostor syndrome further compounded these challenges. Several students openly shared feelings of self-doubt, expressing worries that they lacked the skills required to succeed, despite displaying clear competence in their coursework. These feelings of inadequacy were exacerbated by the high expectations students placed on themselves and the demands of consistently participating in a live classroom setting. Overwhelm was a recurring issue, stemming both from the burden of processing technical content and the emotional toll of sustained engagement.

Anxiety and Trauma Response. Lived experiences and the associated traumas emerged as significant sources of individual challenges for students. During one activity in a leadership seminar, students were asked to reflect on challenges they had faced and discuss how they had worked to overcome those difficulties. This seemingly neutral prompt elicited dramatically different responses based on individual experiences. For one student, the prompt was interpreted as a directive to revisit deeply traumatic events, resulting in emotional overwhelm and a counterproductive experience due to recalling unresolved trauma. In contrast, other students approached the same prompt by reflecting on more routine challenges, highlighting the variability in how students interpreted and responded to instructional activities.

Another student ("Student A") struggled with significant anxiety and imposter syndrome. Through private conversations with instructors, it became clear that she believed others disliked her because of her slower verbal processing speed, which she felt frequently burdened her peers when asking them to slow down or repeat themselves. This perception, rooted in internalized ableism, heightened her feelings of isolation. Additionally, as an immigrant and woman hoping to enter a STEM field, Student A expressed a pervasive fear of systemic discrimination and the need to overcompensate, further exacerbating her anxiety and stress during interactions with her peers.

These challenges came to a climax during a group project, where Student A, under duress from a fast-approaching deadline and perceived inadequate progress, accused her peers of misogyny and xenophobia, as well as sabotaging the group's work. This outburst triggered further tension within the group, particularly for another student ("Student B"), who struggled with self-efficacy issues and brought a deeply personal investment in the program. As an older student, Student B viewed this opportunity as a critical chance to counteract perceived past failures, which heightened his anxiety when faced with challenges. Student B's growing anxiety led to significant stress in the group dynamic, compounding the already tense situation.

This escalation occurred despite the presence and active intervention of an instructor who attended all project group meetings and offered individualized support to both students. However, the intensity of the situation, coupled with the emotional demands of managing the group dynamic, triggered an anxiety response in the instructor himself. This necessitated support from another instructor to de-escalate and effectively address the situation, illustrating the challenges faced by students and the emotional labor and stress incurred by the instructional team in managing sensitive issues.

5.4 Post-Course Outcomes

The placement and employment outcomes from our course cohort ($n = 16$) were promising. Of those who matriculated ($n = 13$), eleven students (85%) secured internship positions involving or adjacent to AI work. Manager feedback across all placements was uniformly positive, as exemplified by this assessment:

> We adore [Student X]. They are smart, easy to work with, and have a great attitude towards getting feedback and learning. [Student X] is just now finishing their research on AI policies, procedures and adoption [. . .], and will be doing a presentation for my whole team next week. They will also be trying their hand at building a prototype of [the company's chatbot] using the research done.

This positive feedback was further substantiated during short post-internship follow-up interviews with eight managers. Six managers (75%) positively evaluated their interns' technical preparation, and all eight managers positively rated their communication experiences with their interns.

Taken with our students' belief that our curriculum's focus on both technical and communication aspects were important in their learning, these results suggest that our curriculum's dual focus on technical and communication skills contributed to successful workplace integration for our students. Post-internship outcomes were encouraging: four students (33% of placed interns) received full-time employment offers.

5.5 Feedback from Instructors

In post-implementation interviews, the instructors shared feedback on the positive impacts of the program and a range of project challenges. The instructors consistently recognized the positive impact of the program on the students, with many sharing anecdotes about their growth. For instance, an instructor highlighted the fulfilling experience of having "multiple students tell me about how much they've grown, and how much it meant to them personally." Regarding challenges, some consistent themes emerged. The instructors identified the following themes in terms of their experience with the project:

- **Value of lived experience:** The instructors who self-disclosed as neurodivergent, especially those with autism, expressed that their personal experiences as learners provided them with valuable insights into the needs of the students, who were also autistic. An instructor noted, "I have this deep understanding of the needs of the mentees."
- **Difficulties in assessing student learning and progress:** The instructors expressed uncertainty about whether the students were truly learning and questioned the effectiveness of the assessment methods. This challenge was exacerbated by the lack of a standardized evaluation system and the instructors' varying instructional approaches.
- **Challenges of diverse needs:** While the lived experience was viewed as a strength, the instructors also highlighted the challenge of addressing the diverse needs within the autistic student population. They emphasized that assuming all autistic individuals learn alike would be inaccurate and potentially detrimental to the learning process. An instructor suggested that instructors might be unable to develop "something that's going to appeal to everybody."
- **Underestimating the time commitment required for the project:** The instructors had to dedicate significant time to building materials from scratch, reviewing daily student surveys, conducting office hours, and providing individualized support to students who needed a strong programming background. Additionally, the instructors had to navigate unforeseen social-emotional challenges faced by the students, which required additional time and effort to address.

These themes suggest that while leveraging lived experience is crucial, navigating the heterogeneity within the autistic learner population necessitates careful consideration of individual needs and a unified instructional approach. Iterative curriculum development informed by both student feedback and instructor reflections is essential for program improvement.

6 Lessons Learned and Discussion

Our findings suggest that while our learning goals and scaffolded pedagogical approach led to successful outcomes for many students, challenges persist in three key areas: (1) adequately integrating technical and communication learning objectives, (2) accommodating diverse communication modalities and preferences, and (3) implementing comprehensive social-emotional support for both instructors and students. We reflect on these areas for improvement as we consider interventions for future iterations of the course.

6.1 Necessity of Deeply Integrating Technical and Communication Skills

The success of the Classifier Training (§ 5.2.3) activity indicate to us that integrating both technical and communication learning goals is potentially effective, and direction for modifying activities for a future iteration of the course. Combined with the results where we saw that introducing both types of skills in the same day but in different activities led to less optimal results, (complete sentence).

Planning and finding opportunities for integrating technical and communication skills was not a trivial endeavor; we observed that including more of these integrated activities demanded more extensive planning and coordination from instructors. While we anticipate that in many learning contexts that not every activity will naturally accommodate both technical and communication goals, careful attention must be paid to maintaining student engagement, comprehension, and learning in these cases. In particular, we found that merely combining technical and communication content within a day was generally insufficient; explicit articulation of the relevance and importance of communication practice is crucial for student buy-in, aligning with documented preferences of autistic learners for understanding the purpose behind educational activities [21].

6.2 Preparing to Support Neurodiversity and Communication Preferences

Our experience with students' varying communication styles and preferences highlighted significant challenges in balancing accommodation needs with workplace preparedness. While professional environments typically favor verbal communication, our findings suggest the need for a progressive approach to communication skill development that builds confidence while respecting individual comfort levels.

Processing speed variations emerged as a critical factor impacting group dynamics. Without careful facilitation, faster-processing students could dominate discussions while others struggled to contribute, or group progress could stall while waiting for responses from members who needed more processing time. These challenges necessitate active instructor moderation to support both communication skill development and effective teamwork. Finding the right balance between challenging students to grow and respecting their individual boundaries requires careful preparation and specific training for instructors in managing group dynamics. Our experience underscores that instructor preparation should go beyond simple awareness of neurodiversity or autism to include specific strategies for managing mixed-pace discussions, facilitating multimodal communication, and supporting students through moments of overwhelm. This level of support requires significant emotional labor from instructors, suggesting the need for comprehensive training programs that address both pedagogical techniques and instructor self-care strategies.

6.3 Providing Social-Emotional Support Infrastructure for Students and Instructors

Our experiences emphasized that while instructor effort and awareness are necessary, helping students manage emotional dysregulation requires a systematic approach. We argue that this requires moving beyond discretionary instructor support to deliberately centering social-emotional support in the curricular process. Social-Emotional Learning (SEL), defined as "the process through which all young people and adults acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals" [17], emerged as a crucial framework for understanding our observations.

In our course, students often exhibited reluctance and anxiety to participate even in low-stakes activities such as Q&A sessions, despite available accommodations for multiple communication modalities. Students frequently engaged in impression management out of fear of judgment from peers and instructors. While providing accommodations for apparent social-emotional dysregulation may offer temporary relief, we believe that a reactive approach — one that responds after students demonstrate challenges - is insufficient for positioning students for long-term success.

We believe that a proactive approach to social-emotional support must involve explicit acknowledgment and understanding by instructors of students' common experiences of marginalization and internalized ableism, combined with trauma-informed pedagogical approaches [20]. Establishing psychologically safe classroom environments is a proactive approach that avoids retraumatizing students [41]. Support systems for both students and instructors should be designed with awareness of potential trauma responses and include clear protocols for managing emotional escalation. Furthermore, instructors need social-emotional training and resources to manage the complex social-emotional dynamics of courses. Instructors supported students through social-emotional challenges such as anxiety and imposter syndrome, as well as disciplinary knowledge development — each requiring substantial effort. Left unmanaged, emotional labor can impact instructor well-being in indicators like job satisfaction, burnout, and occupational stress [7, 50].

Supporting instructor social-emotional well-being, while a worthwhile effort on its own merits, also has positive outcomes for academic success [17]. Students have been shown to struggle academically without positive social-emotional role model instructors. While instructors sometimes fulfill this role [50], students often can be made more vulnerable when trying to develop key skills without socially and emotionally prepared instructors. We believe courses that similarly cater to autistic students should include comprehensive instructor training in trauma-informed practices, clear protocols for managing emotional escalation, and support systems for instructor well-being. Our experiences suggest that effective technical education for autistic students requires intentional, structured approaches to social-emotional learning that support students and instructors. While individual instructor effort is important, we believe systematic integration of SEL principles should be a goal for courses that aim to teach technical skills to autistic students.

7 Limitations

While our findings offer valuable insights for technical education of autistic students, several considerations merit discussion when interpreting our results. Rather than expecting future courses for autistic students to verify our findings, we present this as instructive experiences from a first-of-its-kind online project course on AI and communication skills.

First, our course focused on teaching AI and communication skills to a specific cohort of autistic community college students, and as such our findings and takeaways are specific to this context. The composition of our student cohort was influenced by both our recruitment methods and selection criteria. We believe that our recruitment, which emphasized AI skills training, is likely to have attracted students with existing interest AI. Furthermore, as we selected students who demonstrated readiness for the course's technical and communication requirements for the limited availabilities for the course, this leaves the important work of understanding how to support students with different preparation levels for future work.

Our instructional team included several neurodivergent individuals, including one autistic instructor, which provided increased but specific perspectives into neurodivergent and autistic experiences and as such, our experience represents one point in a broader space of potential approaches to supporting autistic learners in technical education. While lacking formal training in speech-language pathology or autism education, we benefited from collaboration with a speech-language pathologist (SLP) in designing our exercises.

We note that our evaluation of student outcomes prioritized student self-perception of growth and post-course outcomes over structured technical assessments. While this focus on self-efficacy aligned well with our goal of supporting continued engagement with technical learning, we believe there is room for future iterations of the course to adopt more comprehensive assessments into student learning.

8 Conclusion

This work presents our experience developing and implementing an online AI course for autistic community college students. Our students' growth in technical and communication skills during the course, along with their success in subsequent AI-related internships, we believes validates our pedagogical approach of deeply integrating both types of skills.

We also share lessons from teaching our autistic students, from adapting to varying processing speeds to managing diverse manifestations of social anxiety and trauma responses. These insights suggest future directions in trauma-informed pedagogical approaches, comprehensive social-emotional support frameworks, and progressively challenging approaches to technical and communication skill-building. We share these findings to contribute to the growing body of knowledge on creating inclusive software engineering education for autistic and neurodivergent learners.

9 Acknowledgments

Acknowledgments

This material is based upon work supported by the National Science Foundation under Grant No. ITE-2322554.

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