Student experiences in agile stand-up meetings

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Abstract

Purpose – This purpose of this descriptive case study is to examine students' experience engaging in stand-up meetings during the team project for the application development course in their Management Information Systems (MIS) program. Although the body of research on agile stand-up meetings is growing, there is little research on the experience of students who are engaging in stand-up meetings. The majority of research focuses on business professionals instead of students.

Design/methodology/approach – This study uses a mixed methods approach to collect data by anonymously surveying students. This exploratory study is a prelude to implementing a larger-scale investigation of student perceptions of stand-up meetings. The research was conducted using a mixed methods approach that used a survey instrument with both open-ended and closed-ended questions to gather students' perceptions. The qualitative data was analyzed using a thematic coding approach.

Findings – The results of this study demonstrate that students' experiences with stand-up meetings are overwhelmingly positive, with students describing how stand-up meetings helped them communicate and collaborate with their team and solve problems together as a team. The majority of students in this study reported that participating in stand-up meetings helped them overcome roadblocks.

Research limitations/implications – The main limitation of this descriptive case study is the sample size, since only one section of the course was available during the spring semester for the survey. Consequently, the findings may not be broadly generalizable to other contexts. An additional limitation is that the sample was obtained from a school primarily serving nontraditional adult students from underserved groups. One other limitation of this study is that the course surveyed was a synchronous online section with a limited amount of time for class sessions.

Practical implications – This case study should serve as a starting point for faculty, particularly information systems faculty, who are seeking to incorporate stand-up meetings into their courses. The benefits that students cited were clear. As one student stated, stand-up "allows us to vet through our work, help build interpersonal relationships and strengthen our skills." The larger impact and contribution of this research is that encourages faculty to adopt the practice of stand-up meetings to enhance students' communication, collaboration and problem solving.

Social implications – Incorporating stand-up meetings into coursework benefits students by fostering collaboration, communication and problem-solving. The results of this study demonstrate that students' experiences with stand-up meetings are overwhelmingly positive, with students describing how stand-up meetings helped them communicate and collaborate with their team and solve problems together as a team. The majority of students in this study reported that participating in stand-up meetings helped them overcome roadblocks.

Originality/value – This descriptive case study examines students' experience engaging in stand-up meetings during the team project for the application development course in their MIS program. Although the body of research on agile stand-up meetings is growing, there is little research on the experience of students who are engaging in stand-up meetings. The majority of research focuses on business professionals instead of students.

Keywords Agile, Curriculum, Information systems, Information technology

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Stand-up meetings are a popular practice embraced by Agile business teams (Rigby *et al.*, 2016). In the academic environment, the practice of stand-up meetings allows the professor to identify common areas where students need guidance and encourages students to pair together to troubleshoot issues (D'Souza and Rodrigues, 2015). Stand-up meetings foster collaboration, which in turn nurtures respect and trust in the classroom (Hulshult and Krehbiel, 2019).

This descriptive case study examines students' experience engaging in stand-up meetings during the team project for the application development course in their Management Information Systems (MIS) program. Although the body of research on Agile stand-up meetings is growing, there is little research on the experience of students who are engaging in stand-up meetings. The majority of research focuses on business professionals instead of students.

This study uses a mixed methods approach to collect data by anonymously surveying students. This exploratory study is a prelude to implementing a larger-scale investigation of student perceptions of stand-up meetings. The research was conducted using a mixed methods approach that employed a survey instrument with both open-ended and closed-ended questions to gather students' perceptions. The qualitative data was analyzed using a thematic coding approach. The site of the research is a federally designated minority-serving University in the USA, where 75% of students are Pell-grant eligible, 57.6% are low-income, and the majority of students are people of color (Whelan, 2019; Wolfston, 2020). The results of this study will be applied to refine the course curriculum and survey instrument prior to a longitudinal study examining the use of stand-up meetings across multiple semesters. The broad impact of this research is to encourage faculty to adopt the agile practice of stand-up meetings to foster communication, collaboration and problem-solving in their coursework.

Background

This literature review examines the principles of agile methodology, including the practice of stand-up meetings as one of the methodology's rituals. The practice of integrating stand-up meetings into the agile college classroom is discussed. Finally, the curriculum for a course that uses stand-up meetings is presented, including pedagogical artifacts, to help faculty integrate this practice into their own coursework.

Agile methodology

The implementation of Agile methodology transformed the software industry more significantly than any other innovation in the last 30 years (Šalgovičová and Klinčeková, 2020). Agile approaches are now becoming more and more popular across a wide range of industries and roles, including in the C-suite (D. Rigby *et al.*, 2020). Agile incorporates new values, principles, practices and advantages to offer a radical alternative to command-and-control-style management (Alsaqqa *et al.*, 2020). Within Agile, there are several frameworks of the methodology, with Scrum, Kanban and Lean Development as the most prominent Agile frameworks (Denisovna *et al.*, 2020). These agile frameworks were developed to help teams deliver projects on time, within budget, and with a high level of quality in an unpredictable business environment (Parsons *et al.*, 2007; Sandsto and Reme-Ness, 2021).

Businesses that incorporate the Agile methodology and embrace its practices discover that they can adjust to changes more quickly. A study of toy manufacturer LEGO Group's transition to Agile found a major impact of the model is a quicker response to change (Sommer, 2019). One major benefit is the capability to quickly change focus, adapt operations and reassess the approach for business processes (Schmitt and Hörner, 2021).

The new style of working with an Agile mindset brings efficiency, drives innovation and creates positive employee experiences (Koi-Akrofi *et al.*, 2019).

The most popular Agile framework is Scrum, which is an iterative framework, meaning project teams break down tasks into small blocks of time called iterations (Hron and Obwegeser, 2022). The fundamentals of Scrum are straightforward. Organizations create and empower a small team of three to nine full-time employees to take on an opportunity (D. K. Rigby *et al.*, 2016). This cross-functional team contains employees with all of the abilities required to complete the project tasks. The team is completely responsible for all aspects of the project and manages itself (D. K. Rigby *et al.*, 2016). Scrum is distinguished by its adaptability and holistic viewpoint. The methodology is intended to provide substantial value quickly (Alami and Krancher, 2022). The practices of Scrum ensure communication transparency, foster a culture of collective responsibility and promote continuous progress (Šalgovičová and Klinčeková, 2020). One of the Scrum practices used specifically to increase communication, collaboration and progress is holding stand-up meetings.

Stand-up meetings

A recent study of Agile implementation in 20 different organizations found that one of the most commonly embraced Agile practices is stand-up meetings, and another study found that the majority of teams who use Agile methods conduct stand-up meetings (Julian *et al.*, 2019; Stray *et al.*, 2017). During stand-up meetings, the team members literally stand in a circle and provide three updates: their most recently finished task, their next task and their roadblocks to progress (Stray *et al.*, 2017). The reason team members stand is to keep the meeting short.

Stand-up meetings have been found to improve communication between team members and increase collaboration by fostering trust (Hummel *et al.*, 2015; Sandsto and Reme-Ness, 2021; Žužek *et al.*, 2020). Stand-up meetings also allow team members to solve problems. During stand-up meetings, team members report their roadblocks to getting their tasks done, which allows the team to triage problems and help each other to finish their tasks (Morandini *et al.*, 2021). The benefits of enhanced communication, collaboration and problem-solving have contributed to making stand-up meetings one of the most widely embraced Agile practices. While stand-up meetings began as a practice on software development teams, they are now being embraced by all different types of teams, including student project teams in the classroom.

Integrating stand-up meetings into the classroom

With the popularity of stand-up meetings soaring as an industry practice, it is important for higher education to keep up with this trend. Students in computing must be prepared to enter a job market where Agile and stand-up meetings are the norm (Sharp and Lang, 2018). Much of college instruction is still lecture-based and teacher-centered, which does not prepare students to enter the professional workplace, where communication, collaboration and problem-solving are critical to success (D'Souza and Rodrigues, 2015). Students report that if they are learning communication and collaboration skills at all, it is almost an afterthought outside of the classroom, as a part of internships and extracurricular activities (Matusovich *et al.*, 2012). This problem can be solved by integrating stand-up meetings into the college classroom to foster student communication, collaboration and problem-solving (Devedžić and Milenković, 2011; Kessler and Dykman, 2007). At the same time, students learn a popular Agile practice that broadens their business skills.

While research into integrating stand-up meetings in the college classroom is still emerging, promising studies have already been published. A four-year study of upper-

division computer science students found students improved their communication skills through stand-up meetings, particularly in planning and discussing their work, and collaborated more often to solve problems in their code (Monett, 2013). A longitudinal 10-year study on teaching Agile practices found integrating stand-up meetings into the classroom fostered values of openness, respect and courage (Martin *et al.*, 2017). Another study measured the success of incorporating Agile practices, including stand-up meetings, into an online information technology course (Hulshult and Krehbiel, 2019). Students were polled at the end of the course, and the results show that agile improved their learning and raised the quality of their final project (Hulshult and Krehbiel, 2019).

A case study of integrating Agile into student capstone projects found that while teaching Agile practices is challenging, it is worthwhile because it enriches students' software development experience (Lu and DeClue, 2013). Three studies on integrating the Agile practice of prototyping, using low-code tools and robotic process automation, show students feel the Agile skills they gained are valuable for the job market (Lebens, 2021; Lebens *et al.*, 2023; Lebens and Finnegan, 2021). The authors of one study on integrating agile into the classroom concluded that agile practices "should be used in any college course requiring collaboration, group projects, or problem solving," based on how practices such as stand-up meetings foster communication between students (May, 2016).

With the rising popularity of the Agile methodology, integrating Agile practices such as stand-up meetings can help to prepare students for the cutting-edge business environment. Although faculty face the challenge of reworking the curriculum to integrate stand-up meetings into the classroom, there is growing evidence that stand-up meetings benefit students. Stand-up meetings have the potential to foster better communication, collaboration and problem-solving among student teams, which in turn positively impacts the student experience in the classroom.

Course structure

The researchers chose to implement stand-up meetings as a part of a larger group of Agile practices within a software development course. The course that is the focus of this study is an introductory application development course that is part of the information systems (IS) core curriculum. MIS students are required to take this course as a part of their degree requirements. Although the course is an upper-division course, there are no prerequisite programming, math or logic courses, so the curriculum is structured as an introductory programming course.

The course is taught online with weekly synchronous class sessions in a 16-week semester format. In the first half of the course, students learn the basic structures of the Python programming language, including variables, operators, conditional statements, repetition statements (loops), data structures, command-line input/output (I/O) and file I/O. After eight weeks, they take a practical midterm exam, which requires them to build an application that uses the basic structures of the Python language. Students who pass the midterm exam progress on to a team project to develop an application of their own design. Students complete several lessons on Agile methodology practices, including stand-up meetings, so that they are prepared to use the Agile methodology with their project team. During the project, the student teams engage in two development sprints, and they are required to hold stand-up meetings during their sprints.

Pedagogical artifacts

The assignment instructions for stand-up meetings are included in this section to serve as a curricular support for faculty seeking to use stand-up meetings in their own courses. In addition to discussing the instructions in class, students also prepare for stand-up meetings

by engaging in a short interactive online module with videos and lecture on stand-up meetings and by reading the classic article "Daily Stand Up Meeting" by Don Wells, one of the pioneers of the Agile methodology eXtreme Programming (Wells, 1999). They also take a short quiz to measure their knowledge after completing the interactive module and reading the article.

Assignment Instructions for Stand-Up Meetings:

Sprint #1 and #2 - Stand-up meetings

(1) Schedule a time in Zoom to meet with your team for the stand-up meeting during the sprint;

(2) Invite your professor to the meeting so she can see that the meeting has been scheduled;

(3) Participate in the stand-up meeting;

(4) Record the meeting in Zoom:

- Directions on how to record a meeting in Zoom;

(5) Each person on the team should take turns answering the following questions:

- Stand-up meeting questions
  - What task did you just finish?
  - What is your next task?
  - What are your roadblocks?

(6) Upload a Word document containing the link to your video in the Sprint-Stand-Up Meeting assignment dropbox. (Source: figure created by authors)

Methodology

This descriptive case study is intended to serve as a condensed study performed with students in a single section of an online application development course before implementing a large-scale longitudinal investigation of students' experiences with stand-up meetings over several sections of the course. The goal of this descriptive case study is to determine if the students experiences with stand-up meetings are positive enough to necessitate expanding this approach to a large number of sections of the course, as well as possibly expanding the approach to other courses in the IS department. The aim of this descriptive study is to encapsulate, in the students' own words, their experiences with stand-up meetings. The research method chosen for this study is an anonymous survey consisting of open- and closed-ended questions to collect both qualitative and quantitative data. The mixed methods approach was chosen for this descriptive case study because it provides a theoretical perspective at a greater level than straight Likert-scale questions would provide.

Prior to conducting the research, a research proposal was submitted to the Institutional Review Board (IRB) at the researchers' home institution, and the IRB was approved by the research board. Before answering the survey questions, the student respondents read and voluntarily agreed to a consent form describing the way the data would be used as well as the minimal risks involved. During one of the weekly online class sessions for the course, student respondents were given 10 minutes to complete the survey if they chose to participate. Students who did not want to take the survey were given the alternative of taking a short break instead of participating in the survey. Students were not offered course credit or extra credit for participating.

Research setting and participants

For this study, stand-up meetings were introduced in the spring 2022 semester in one section of an undergraduate upper-division application development course. The student population in the course consisted of juniors and seniors who were MIS majors. The application development course is required for MIS majors. The sample consisted of 28 nontraditional upper-division undergraduates enrolled in an online synchronous section. In total, 19 students elected to take part in the study out of the 28 students who were extended the opportunity to participate.

The site for this study is an urban, mid-size, public university where the average student is 29 years old. The University is a federally designated minority-serving institution, meaning the majority of students are students of color. 75% of the students at the university are Pell grant eligible, and 57.6% reside in lower-income households (Whelan, 2019; Wolfston, 2020).

Materials

The survey was conducted through the Qualtrics online survey tool. Qualtrics is a commonly used professional tool, with a customer base of over 16,000 clients (About Qualtrics, 2023). The list of questions presented below was included in the survey instrument:

- Q1: Participating in stand-up meetings helped me get to know my classmates better.
- [Likert Scale: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree]
- Q2: Participating in stand-up meetings helps students collaborate with each other.
- [Likert Scale: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree]
- Q3: As a result of sharing roadblocks during stand-up, students helped each other to overcome their roadblocks.
- [Likert Scale: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree]
- Q4: Participating in stand-up meetings in class is a valuable experience.
- [Likert Scale: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree]
- Q5: What are the benefits of stand-up meetings?
- [Open-Ended]
- Q6: What are the drawbacks to stand-up meetings?
- [Open-Ended]

Procedure

Students completed the survey during an online synchronous class session on April 25, 2022. The survey was conducted during the final week of the course, after students had finished participating in stand-up meetings as a part of the course activities. The data was downloaded from Qualtrics and then exported into an Excel spreadsheet format to perform the analysis.

Analysis

The quantitative data results were tallied to determine the most common responses to each of the closed-ended questions. These questions used a Likert rating scale to present a set of

options that covered a range from strongly agreeing to strongly disagreeing with the researchers' statements on stand-up meetings. The five-point scale allowed the researchers to analyze the level of agreement to gauge students' experiences with stand-up meetings.

To investigate the students' open-ended comments on their experiences with stand-up meetings, an inductive coding approach was chosen for the analysis of the qualitative data. This approach was selected due to its ability to allow the data to guide the formation of codes and themes, rather than imposing preconceived categories on the data.

The process began with a thorough exploration of the data, during which the researchers studied the responses to the survey questions. This study allowed them to gain a deep understanding of the content and context of the responses. Following this, the practice of qualitative data coding was used to create and assign codes that categorized these responses.

The coding process was iterative, with the researchers going back and forth between the data and the emerging codes. This ensured that the codes were grounded in the data and accurately represented the respondents' experiences. The researchers also maintained a coding diary, which documented the development of the codes and provided a rationale for their creation. This diary served as an analytical pathway, linking the raw data to the final themes.

Once the codes were created and assigned, an inductive coding analysis was performed on the qualitative data. This involved looking for patterns and relationships between the codes and then grouping similar codes together to form themes. These themes represented the most frequent and significant ideas present in the data.

Throughout the analysis, the researchers were mindful of their own potential biases and took steps to address them. They engaged in reflexivity, regularly reflecting on their own beliefs, values and experiences and how these might influence the analysis. They also sought feedback from other researchers in the field of information systems (IS) to challenge their interpretations and ensure the validity of the findings. The goal of this analysis process was to establish the plausibility of the study findings, despite the small sample size typical of qualitative case studies.

Results

The participation rate for the survey was fairly high, with 19 of the 28 students in the sample joining in the study. 63% of the students strongly agreed or somewhat agreed that participating in stand-up meetings helped them get to know their classmates better, as shown in Figure 1. 79% of students strongly or somewhat agreed that participating in stand-up meetings helps students collaborate with each other, as shown in Figure 2.

As shown in Figure 3, 79% of the students strongly agreed or somewhat agreed that as a result of sharing roadblocks during stand-up, students helped each other to overcome their roadblocks. 84% of students strongly agreed or somewhat agreed that participating in stand-up meetings in class is a valuable experience, as shown in Figure 4.

The researchers used an inductive coding analysis to scrutinize the data from survey questions 5 and 6. The researchers opted for this method as it allows the data to shape the formation of codes and themes instead of forcing preconceived categories onto the data. The initial step involved a comprehensive review of the students' responses, enabling the researchers to gain a deep understanding of the content. Subsequently, codes were developed based on these responses. The coding process was cyclical, with the researchers continuously revisiting the data and the evolving codes. This ensured that the codes were firmly rooted in the data and accurately depicted the students' experiences.

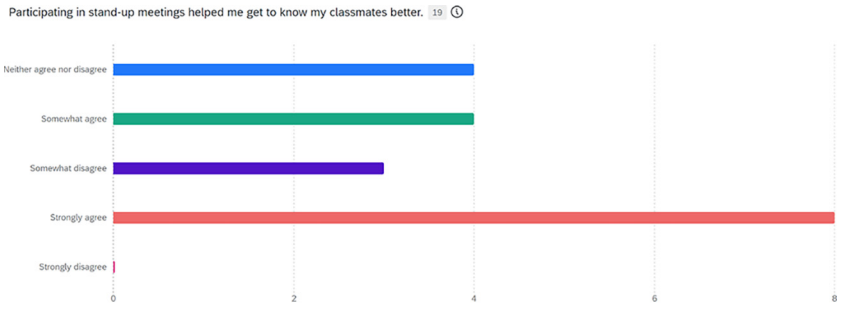


Figure 1.
Survey question 1

Source: Figure created by authors

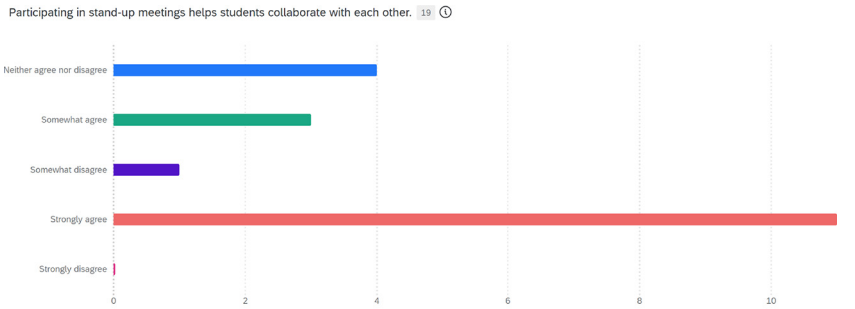


Figure 2.
Survey question 2

Source: Figure created by authors

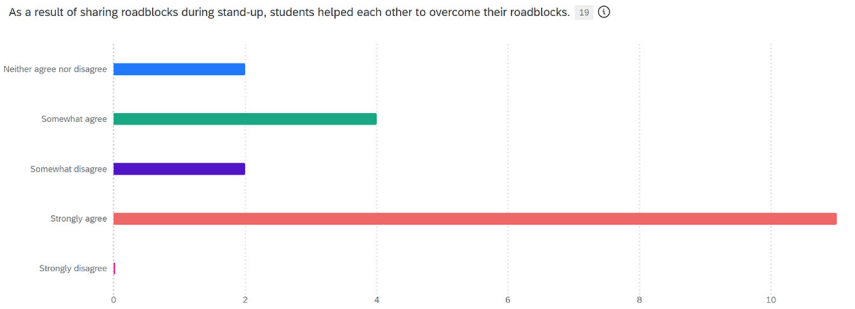
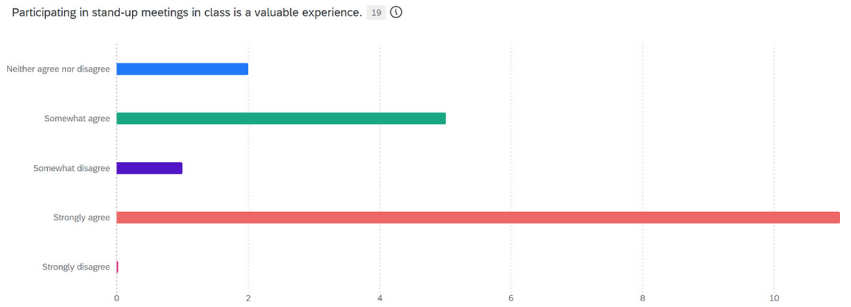


Figure 3.
Survey question 3

Source: Figure created by authors

During the inductive coding analysis, the researchers identified several common categories, which are described in Tables 1 and 2. The respondent IDs in Tables 1 and 2 correspond to the full text of the responses that is included in the Appendix of this paper. The categories presented in Tables 1 and 2 were not predetermined but emerged organically from the data as a part of the inductive coding analysis. Responses with similarities were grouped into



Source: Figure created by authors

Figure 4.
Survey question 4

Code	Respondent IDs
Problem-solving	2, 10, 12, 15, 16, 17, 18
Collaboration	10, 12, 16, 17
Career preparation	11
Communication	3, 7, 9, 13, 14, 15, 16, 17, 18
Short length	19

Source: Table created by authors

Table 1.
Inductive coding analysis results for survey question 5: benefits of stand-up meetings

Code	Respondent IDs
difficult to coordinate meeting time	3, 10, 16
little to report	15
negative reactions to criticism	17
too short	19
felt tedious	11
Team members are confused	14

Source: Table created by authors

Table 2.
Inductive coding analysis results for survey question 6: drawbacks of stand-up meetings

these categories, facilitating the identification of recurring themes. These themes encapsulated the most critical ideas in the data.

In response to question 5, "What are the benefits of stand-up meetings?," common themes that emerged are that stand-up meetings foster communication, collaboration and problem-solving. The most common theme is that stand-up meetings improved communication among team members, with eight out of the 19 responses to question 5 describing communication as a benefit of holding stand-up meetings. Other common themes in response to question 5 were how stand-up meetings helped team members fix problems and understand what each other was accomplishing in terms of completing project tasks.

Question 6 asked "What are the drawbacks to stand-up meetings?" The only drawback that was mentioned more than once in the responses was that it was difficult to find a time when all team members were available for their stand-up meeting. The remaining

drawbacks cited were limited to a single response each, leaving finding available time for stand-up as the only common theme for question 6.

Discussion

Students' experiences with stand-up meetings were overwhelmingly positive in this case study. 84% of students strongly agreed or somewhat agreed that participating in stand-up meetings in class is a valuable experience, as shown in Figure 3. Students expressed far more positive than negative perceptions of stand-up meetings in their responses to the survey questions.

The majority of students felt that participating in stand-up meetings helped them get to know their classmates better. This finding was consistent with the literature showing that stand-up meetings foster communication between team members. The majority of students responding to the survey also felt that participating in stand-up meetings helps students collaborate with each other. This finding was also consistent with the literature showing that stand-up meetings facilitate collaboration within project teams.

While the students' responses to the Likert scale survey questions demonstrated students felt positively about the stand-up meeting experience, the majority of the students' responses to the open-ended questions also highlighted positive sentiment toward stand-up meetings. The student's open-ended responses are cited in this section using the Respondent ID (RID), which corresponds to the full text of the students' responses in the Appendix. The students' open-ended responses to the qualitative portion of the survey highlighted the benefits of communication and collaboration during stand-up meetings.

One student mentioned that a benefit of stand-up meetings is that the students "all got the chance to talk and get to know each other better" (RID 16). Another student described how stand-up meetings encouraged teamwork in their response: "Personally, i[*sic*] think wherever there is collaboration and teamwork, the outcome is great" (RID 17). Students mentioned that stand-up meetings "allow for everyone to get on the same page quickly" and "make sure everyone was on the same page in different stages of the project" (RID 18, 15). The comradery encouraged by stand-up meetings was evident in another student's response to the benefits of stand-up meetings, "I thought it was nice to hear where some of my peers were also struggling. Not in any sort of a bad way, it is just insightful to hear what hangs people up" (RID 15). This student's experience highlights how stand-up meetings can help students engage by learning that they are not the only person in the class struggling with a particular concept or task. In a similar vein, another student described the primary benefit of stand-up meetings as "reaching out for help and others will have an opportunity to help the teammate that is in need" (RID 10). Clearly, this student experienced positive collaboration with their classmates as a result of participating in stand-up meetings, which is consistent with the findings in the literature that stand-up meetings foster collaboration.

In addition to positive experiences with communication and collaboration as a result of stand-up meetings, students also overwhelmingly agreed that stand-up meetings facilitated problem-solving. As shown in Figure 3, 79% of the students agreed that as a result of sharing roadblocks during stand-up, students helped each other to overcome their roadblocks. In addition, several students mentioned problem-solving as a benefit to stand-up meetings in the open-ended responses to question 5. One student described how stand-up meetings "encourage all participants to efficiently explain the problems going on within the project" (RID 18). Another student explained how stand-up meetings helped their team solve problems: "We knew when someone was struggling with something and could offer clarification/help before 'crunch time'" (RID 15). Communication, collaboration and problem-

solving were clearly positive aspects of the students' experiences with stand-up meetings, which reinforces earlier findings in the literature.

While students' experiences with stand-up meetings were mainly positive, there were some drawbacks as well. The most common drawback that students described was finding time to meet together. This is not surprising, since they were attending an online course section. The course was scheduled with only one hour of synchronous class meeting time per week, so students needed to schedule the stand-up meetings with their teams outside of class time. One student mentioned that it is "hard to find the right time for every member to meet up" (RID 10). Another student wrote that "it is difficult to coordinate a time that consistently works for everyone's schedule, leaving people who aren't able to make the meeting out of the loop" (RID 3).

One approach faculty could take to help find a consistent time for stand-up meetings is to schedule meetings as a part of the regular class session time. If this is not possible, such as in asynchronous online courses or courses with limited seat time, the faculty member could provide students with a polling tool to help with scheduling. Popular polling tools such as Doodle, Microsoft Bookings and Poll Everywhere allow a meeting organizer to specify several possible meeting times. Team members can then respond to the poll to indicate which meeting times work well with their schedule.

Although difficulty finding a common meeting time was by far the most prevalent drawback students cited, there were a few other drawbacks to stand-up meetings mentioned by individual students. One student described how meetings "felt tedious," which another said "sometimes group members didn't have much to report" (RID 11, 15). Faculty could emphasize the importance of being prepared and of keeping the meeting moving quickly by modeling a stand-up meeting in class, so students experience an example of a successful meeting before they move into scheduling their own stand-up meetings with their teams. If the course does not allow for an in-class meeting because it is an asynchronous online course, faculty could provide a video of a successful stand-up meeting to model best practices.

Another student pointed out that "stand-up meetings are not great for initial meetings where longer planning is needed or may be required. In our group, our first half of the semester was 'waterfall' based, as it required more planning for the initial development. Once we transitioned to the sprints, the stand-up meetings fit better and aided the work we were completing" (RID 19). When faculty are planning out the course timeline, they may want to consider including longer planning meetings at the beginning of the project to allow teams to develop the requirements and user stories for the project. Then, after the initial planning is finished, students could transition to stand-up meetings for their development sprints.

Limitations and future research

The main limitation of this descriptive case study is the sample size, since only one section of the course was available during the spring semester for the survey. Consequently, the findings may not be broadly generalizable to other contexts. The researchers recognize that the limited sample restricts the ability to draw larger conclusions. To address this, they plan to repeat the study across multiple semesters, collecting longitudinal data on students' experiences with stand-up meetings to enhance the study's robustness.

An additional limitation is that the sample was obtained from a school primarily serving nontraditional adult students from underserved groups. The university's unique demographic composition warrants attention. It is a federally designated minority-serving institution where the majority of students are students of color, are eligible for Pell grants and reside in lower-income households. While this specificity provides rich insights into the stand-up meeting experiences of nontraditional adult learners, it also introduces limitations.

The experiences of students from other backgrounds or age groups may differ significantly. A future area of research is repeating this study with traditional university students to see how traditional students' experiences with stand-up meetings differ from the experiences of the students in this study. Investigating differences in stand-up meeting dynamics between these two groups will contribute to a more nuanced understanding of using agile practices in the college classroom.

One other limitation of this study is that the course surveyed was a synchronous online section with a limited amount of time for class sessions. Students in asynchronous online course sections and face-to-face course sections may report different experiences with stand-up meetings. For example, in a face-to-face course, stand-up meetings could be held in person as a part of the normal class period, which may encourage a higher level of participation. In summary, while this study sheds light on stand-up meeting practices, the researchers acknowledge these limitations and remain committed to refining their understanding through ongoing research on agile practices in the college classroom.

Conclusion

Incorporating stand-up meetings into coursework benefits students by fostering collaboration, communication and problem-solving. The results of this study demonstrate that students' experiences with stand-up meetings are overwhelmingly positive, with students describing how stand-up meetings helped them communicate and collaborate with their team and solve problems together as a team. The majority of students in this study reported that participating in stand-up meetings helped them overcome roadblocks.

This case study should serve as a starting point for faculty, particularly information systems faculty, who are seeking to incorporate stand-up meetings into their courses. The benefits that students cited were clear. As one student stated, stand-up "allows us to vet through our work, help build interpersonal relationships and strengthen our skills." The larger impact and contribution of this research is that it encourages faculty to adopt the practice of stand-up meetings to enhance students' communication, collaboration and problem solving.

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Appendix

Respondent ID	What are the benefits of stand-up meetings?	What are the drawbacks to stand-up meetings?
1		
2	Problem solve	
3	Helps get info across	It is difficult to coordinate a time that consistently works for everyone's schedule, leaving people who aren't able to make the meeting out of the loop
4		
5		
6		
7	communication	
8		
9	I thought it was nice to hear where some of my peers were also struggling. Not in any sort of a bad way, it is just insightful to hear what hangs people up	n/a
10	Reaching out for help and others will have an opportunity to help the teammate that is in need	Hard to find the right time for every member to meet up
11	Gives you a brief insight of how stand up meetings may work in the future	Felt tedious
12	Collab, fix problems	Encountered none
13	Being open with your peers about your progress with your task	Some could say waste of time but i say its good use of time
14	Knowing what team members are doing	Members are confused
15	I liked the opportunity to make sure everyone was on the same page at different stages of the project. We knew when someone was struggling with something and could offer clarification / help before "crunch time."	Sometimes some group members didn't have much to report - which is understandable
16	We all got the chance talk and get to know each better while helping each understand the assignment	There wasn't really any that I can think of. I think sometimes we all struggle to find the time that works best for all of us. Other than that everything else was good
17	Personally, i think wherever there is collaboration and teamwork, the outcome is great. From previous experience, we have accomplished much more when we are together, it allows us to vet through our work, help build interpersonal relationships and strengthen our skills	The only drawback would be that some team members may have challenges like stepping on each other's toes, overcareful, not knowing how the other person would react when giving feedback or having positive criticism
18	They encourage all participants to efficiently explain the problems going on within the project and what has already been completed. It allows for everyone to get on the same page quickly	It heavily relies on the team already being very communicative, thankfully mine was, so it worked out well

(*continued*)

Table A1. Student responses to open-ended survey questions

Respondent ID	What are the benefits of stand-up meetings?	What are the drawbacks to stand-up meetings?
19	Stand-up meetings work well for the reason that time is the most valuable resource we have. Knowing that a meeting won't last long, one's mindset is more likely to be in tune with the content of the said meeting	Stand-up meetings are not great for initial meetings where longer planning is needed or may be required. In our group, our first half of the semester was "waterfall" based as it required more planning for the initial development. Once we transitioned to the sprints, the stand-up meetings fit better and aided the work we were completing

Table A1.

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