
Title	Closing the gender gap in a mobile game-based learning curriculum
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Source	<i>American Educational Research Association (AERA) Annual Meeting, Philadelphia, Pennsylvania, 3-7 April 2014</i>

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Session Title Advanced Technologies for Learning Roundtable

Session Type Roundtable Presentation

Presentation Date 4/5/2014

Presentation Location Philadelphia, Pennsylvania

Descriptors Assessment, Classroom Research, Technology

Methodology Mixed Method

Unit SIG-Advanced Technologies for Learning

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Closing the Gender Gap in a Mobile Game-Based Learning Curriculum

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Abstract

The purpose of this paper is to investigate whether the design of a mobile game-based social studies curriculum influences the level of participation and the quality of student work of ninth-grade girls. The results of the first intervention study suggest that no significant gender differences were found for the quality of student work. However, the boys' level of participation in playing the game was significantly higher than the girls'. After modifications were made to the digital game for the second intervention study to address the level of participation in game play, the gender difference remained significant. There were no significant gender differences in quality of student work were identified in the second iteration.

Paper presented at the AERA 2014 – The Annual Meeting of the American Educational Research Association 2014 in Philadelphia, USA, 3 – 7 April 2014, in Advanced Technologies for Learning Roundtable Session.

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Introduction

The purpose of this paper is to examine whether the design of a mobile game-based curriculum influences the level of participation and the quality of student work of ninth-grade male and female students in Singapore.

Gender and gaming

Studies have shown that there are gender differences in the level of general participation in gaming. Indeed, prior research has found that males spend more time playing computer games than females (Bertozzi & Lee, 2007; Buchman & Funk, 1996; Chou & Tsai, 2007; Colwell & Payne, 2000; Green & McNeese, 2008; Lucas & Sherry, 2004; Solomonidou & Mitsaki, 2009; Winn & Heeter, 2009). Males had traditionally more

access to public leisure spaces such as video arcades, bars, and pubs (Dickey, 2006; Griffiths, 1991), and domestic spaces such as computers and television sets in the living room (Dickey, 2006; Facer, Furlong, Furlong, & Sutherland, 2001; Schott & Horrell, 2000).

These gender differences in the level of general participation in gaming have raised concerns that it may translate into gender differences in learning when game-based learning is introduced in schools. Jenson and de Castell (2010) pointed out that early work on gender and game play came about as a result of an initial concern for the low numbers of women and girls in the field of computing. Cassell and Jenkins (1998) theorized that if girls and women were to develop skill and interest in playing video games, more might be prompted into entering the world of computing. In addition, Jenson and de Castell (2011) have also remarked that there are gendered patterns of technology access, interest, and competence. They argued that boys' early and sustained exposure puts them at an advantage with respect to computer competence and confidence when they enter schooling. Moreover, the game content of video games in the market also caters more for males than females (Lucas & Sherry, 2004). Thus, with the advent of the use of computer games in schools for learning, girls may be disadvantaged.

Therefore, there is an urgent need for educationally-based research to investigate gendered patterns of game play in schools as a way to inform more equal participation and learning for both boys and girls. In her investigation of the learning effectiveness of an educational computer game for learning computer memory concepts among 88 16- to 17-year-old students in two Greek high schools, Papasterigou (2009) found that there were no significant differences in learning gains between boys and girls despite boys' prior greater involvement and experience with computer gaming. However, since the students in her study played the computer game during specific lesson time slots, both boys and girls spent similar game play time. She did not investigate whether there were gender differences in game play time if students could decide their level of participation, something that a

mobile game played outside of class might afford. Moreover, her study also could not inform how games might be designed for a more level playing field. If there is a significant gender difference in the level of participation, a game-based learning approach may lead to inequalities in learning.

To address the knowledge gap described above, we have designed a study to understand gender differences in the context of game-based learning in schools. In particular, we study the phenomenon with a mobile strategy game for social studies—*Statecraft X*. Installed on Apple iPhones, *Statecraft X* enables both boys and girls to have primary access to and control over public and domestic spaces. Girls could choose how, when, and where to play it. Two research questions are designed to address the knowledge gap:

- (1) Are there gender differences in mobile game play time and the quality of student work in two intervention studies?
- (2) Does game design influence mobile game play time and quality of student work in the above interventions?

Situated meaning-making and ‘Play-Between-World’ game-based learning experience

Imagine a mathematics classroom where the concept of circumference is being taught. Despite her best efforts at informing students the acceptable definition of ‘circumference’, she found the answer “the distance covered when you walk in a circle.” This is despite her best efforts at informing her students what the acceptable definition of “circumference” should be. Upon reflection, she wonders if she could have contributed to the misconception by illustrating the concept through demonstrating walking in a circle and explaining the concept in terms of the distance covered.

The vignette above should be a familiar scenario to many teachers. Under a transmission model of learning, it is assumed that a word, when communicated by the

teacher, would mean the same thing to the students as she understands it and intends it to be understood. However, studies of cognition from the situated perspective have shown that people draw upon their prior experiences to make meaning. For instance, studies of language provide evidence for such a situated perspective of knowing. In reference to argumentation, Gee (2003) notes how we say things like “He destroyed your point,” or “She defended her grounds.” It does seem to the interlocutors that the argumentation is like a combat. In addition, we may go beyond saying that the use of such metaphors simply encodes experiences. It may also be the case that a word spoken has affordances for making an experience. In explaining his ethnomethodological perspective of “context,” Dourish (2004) noted, with reference to the work of Sacks (1984), that “what people report in ordinary day speech are not simply state of affairs but the ordinary nature of those state of affairs, and this is done by the way they are spoken about or not spoken about” (Dourish, 2004. p. 24).

The situated perspective of meaning-making forms the basis for the kind of learning experience that we aimed to create for the students in our game-based learning study. Here, we created a common experience for students so that they would be able to discuss and write about the experience. This learning experience was conceptualized as “Play-Between-Worlds” (PBW)—a nod to Taylor’s (2006) book of the same name—as illustrated in Figure 1.

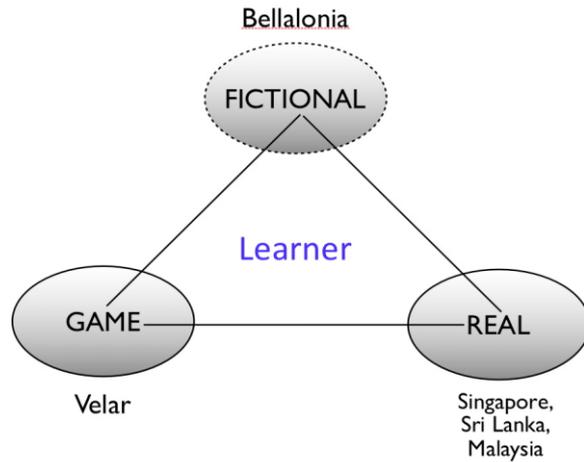


Figure 1. The “Play-between-World” game-based learning experience.

The PBW learning experience was in part pre-designed. To situate students in the “fictional” world, we set up the over-arching role-playing scenario of Bellalonia. The teacher role-played the Grand Sage of Bellalonia, while the students took on the role of beginning governors. The teacher presented to the students the scenario of Bellalonia and the range of social and economic problems that it faced. She then challenged them to deliver a speech advocating solutions for Bellalonia, with the reward of their becoming governors of Bellalonia based on the quality of their speech. To enable the students to gain the requisite experience of governorship for the speech, the teacher sent them into the “game” world of Velar. In the kingdom of Velar, the students were tasked with advancing the economic and social progress of the towns they governed, as well as that of Velar. The first game objective was that all players must ensure that Velar survived in the face of attackers from other kingdoms. Second, individual players must consolidate their power and position by winning the trust of the people in their own towns and other towns. To realize these two objectives, players must realize short-terms goals such as developing towns under their control and maintaining diplomatic ties. Players had a choice of whether to collaborate or compete with each other. To ensure that students were still situated in the overarching scenario of Bellalonia outside of school time when they played the game, the first and second authors set up a web-based Bellalonia news portal to inform students of events happening both in the

game and the fictional worlds. The first author would post learning materials related to the “real” world of Singapore, Sri Lanka and Malaysia to invite students to consider their fictional and game experience from the perspective of the real world and vice versa.

In addition, the PBW learning experience was in part created through dialogue. This was enabled over three platforms. First, between consecutive episodes of out-of-school game play, the teacher would facilitate a whole-class discussion during curriculum time. During a typical discussion, the students, role-playing as prospective governors of Bellalonia, would discuss their game-play experiences. The teacher would also facilitate them in reflecting on their game experiences based on their experience of the governance of Singapore and their knowledge of real-world governance. Second, the students could take their dialogue online. The Velar game included an in-game chat system for real-time communication. The web-based Bellalonia news portal also included a forum where students could discuss issues related to the three worlds. Third, the students had to prepare an election speech that they had to deliver after the end of the game to the whole-class and the teacher. The students had to deliver their speech by means of context-appropriate and balanced expositions that nevertheless reflected their own perspectives and voice.

Method

Participants

Seventeen boys and 24 girls, and 14 boys and 20 girls, aged 14-15 years, participated in the first and second interventions, respectively. The first group of students was in the top class of the high-ability academic track while the second group of students belonged to the lower end of the same track in the same school. Three social studies teachers participated in our intervention studies. One of them participated in both interventions.

Before the start of each intervention study, we informed the teachers and parents of students in the participating classes that their participation was voluntary. In the letter of consent, we told them the procedure to be followed, the confidentiality of personal details

and participants of the study, the duration of the study, and the risks and benefits of their participation.

Materials

Apple iPhones with the *Statecraft X* game, designed based on the principles of governance in Singapore's Social Studies curriculum for ninth-grade students were loaned to all students, who were divided into teams for game play, for the duration of the research interventions.

The research team set the game play timings according to the wishes of the school management. On weekdays, students could log in from 6 a.m. to 8 a.m., and from 2 p.m. to 10 p.m. On Saturdays, students could log in anytime from 6 a.m. to 11 p.m. In other words, students have plenty of space and agency to decide their level of participation.

The primary difference between the game design of the first and second interventions was the positioning of the game at the beginning of the lesson. In the first intervention, the winning team was positioned as the team that captured the capital city of Velar before the invasion led by the neighboring country Salfreda. However, in the second intervention, the team that won was the team that had the highest composite score of average happiness of citizens in a faction, economic score (profit), and population levels in the towns under their charge. Score charts were posted on the *Statecraft X* website.

Another change in game design was that in the first intervention, the team members in each team did not share a common pool of money given to the team; each team member managed his or her own funds, whereas in the second intervention, team members had to share a common pool of money to encourage collaboration among team members as they had to discuss strategies in using the limited pool of money.

The third change in game design was the encouragement of the use of diplomacy instead of force to take over towns. Students were given the opportunity to organize a rally to win over the towns' citizens.

Instruments

The authors used three instruments to collect data from the students in both interventions. The post-intervention survey collected game play time data while the written essay assessed the quality of student work in terms of relevance of content, perspective, and personal voice. The authors also conducted a post-intervention interview after each intervention.

Procedure

Prior to the research intervention, the three teachers participated in a two-day professional development workshop that was designed to prepare them for the enactment of the *Statecraft X* curriculum. The research team gave them the game to play during the workshop session and showed them the *Statecraft X* curriculum. They gave feedback on the lesson plans designed and worked with the research team to finalize the in-class and outside-classroom activities of the learning programme.

The teachers divided the students into two groups for game play as well as whole class discussions. Each teacher was in charge of one group. During the first session, all students were together in one computer laboratory. During the subsequent five sessions, they were located in two separate computer laboratories. All lessons were video-recorded.

Lesson 1. For both interventions, one teacher explained to the students the Play-between-Worlds curriculum model using slides provided by the research team. She also explained the history of Bellalonia and its current problems. The game designer then presented the backstory of the game world of Velar and showed students the various game actions. Then, the research team distributed iPhones to all participating students.

Lessons 2 to 5 in First Intervention. The teachers facilitated discussions about game play so that students could draw lessons from their game play and the real world to propose solutions for Bellalonia.

Lessons 2 to 6 in Second Intervention. For the first thirty minutes of the lesson, students typed their individual responses to questions related to Velar, Bellalonia, and the real world. In the last thirty minutes, the teachers gathered students in a circle and discussed their responses.

Lessons 6. Five students from each group presented their speeches. The teachers conducted a final discussion. The first and second authors administered the survey on game play time.

Post Lesson 6. The first author administered an essay in both interventions. Students were given thirty minutes to write an essay (see Figure A2 for a sample of the instructions and student essay). We conducted interviews for all participating students.

Data Analysis

We used the Welch analysis to determine whether there were gender differences in game play time and quality of student work and the Games-Howell pairwise comparisons to determine whether there were differences between game play time among the four groups of girls and boys in the two interventions. For the essays, the first and second authors assessed (1) relevance, (2) perspective, and (3) personal voice (see Figure A1). Relevance refers to how relevant the policies proposed by a student are to the social and economic needs of the different segments of the country's population. Perspective refers to whether a student could give multiple perspectives to the proposed policies and integrate them. Personal voice refers to the voice used by a student.

The first and second authors assessed each essay separately and awarded a mark for each criterion. They hold graduate degrees, have at least eight years of teaching experience in Singapore schools, and were part of the research team. The first author also had three years of experience in an improving teachers' assessment literacy research project where she trained teachers to assess student work based on a scoring guide and exemplars of student work during assessment workshops. She acted as an adjudicator during score resolution

sessions if two teams of teachers gave different scores to the same student work. After assessing all essays separately, the first two authors moderated together the marks for each criterion in each essay. When there was a discrepancy in the scores given, they compared the features of the essay with the benchmark performance given in the scoring guide and discussed why the student should be awarded a certain score. They considered any evidence that challenged the original scores and achieved a consensus score. They then assigned this consensus score for each criterion. To calculate exact and adjacent agreement between the first two authors, the first author transformed the students' scores to the level scores as indicated in the analytic rubric, i.e., scores of 1-5, 6-10, 11-15, and 16-20 were transformed to level scores 1, 2, 3, and 4 respectively.

Results

Game Play Time

In the first intervention and second interventions, there were significant gender differences in game play time (see Table A1). Boys spent significantly more time playing *Statecraft X* per week than girls. However, Games-Howell pairwise comparisons revealed that the differences were significant between mobile game play time of the girls in the first ($M = 7.35$, 95% CI[11.07,27.33]) and second interventions ($M = 16.13$, 95% CI[10.61,21.64]), $p < 0.031$. The difference was not significant for mobile game play time for boys in the first and second interventions.

Descriptive statistics (see Table A2) also indicate that girls in the first intervention who were put in mixed teams did engage in more game play ($M = 8.86$, $SD = 8.01$) compared to those who were placed in same-sex group ($M = 5.25$, $SD = 4.40$). This was also the case for the second intervention group where the girls in the mixed group also spent more time playing *Statecraft* ($M = 19.00$, $SD = 12.29$) than the girls in the same-sex group ($M = 11.81$, $SD = 10.20$).

Quality of Student Work

Figure A2 shows a sample of student work. Table A3 shows the distribution of scores given to students in the first and second intervention groups, and Tables A4 and A5 show the score agreement rates between raters. For both interventions, there were no significant gender differences in the quality of student work (see Tables A6 and A7). There were also no significant differences in quality of student work between the first and second interventions for both boys and girls.

Discussion

The objectives of the present study were (1) to investigate whether there were gender differences in mobile game play time and the quality of student work in each intervention and (2) to investigate whether game design influenced mobile game play time and the quality of student work in ninth-grade students who participated in the *Statecraft X* mobile game-based curriculum. Previous studies have not compared gender differences in game play time if both males and females could occupy gaming spaces readily. To the best of our knowledge, the present study is also a first attempt to look at mobile game play time and quality of student work among high school students. Consistent with previous studies (Bertozzi & Lee, 2007; Buchman & Funk, 1996; Chou & Tsai, 2007; Green & McNeese, 2008; Solomonidou & Mitsaki, 2009; Winn & Heeter, 2009), we found that boys reported spending significantly more time playing *Statecraft X* than girls in both first and second interventions. We will now discuss the factors that could have contributed to significant gender differences in mobile game play time and to non-significant gender differences in quality of student work.

Mobile Game Play

It does not seem that having greater agency over participation in gaming resulted in more equal participation among the boys and girls of the present study. The results of this

study suggest that technology access may not be the major factor that in general, girls are playing digital games less often than boys. As Jenson and de Castell (2011) have suggested, it seems like competence resulting from experience playing digital games may be a factor. Girls might need help to play the game. Indeed, in both the first and second interventions, girls seemed to spend more time in game play when they played in mixed groups rather than same-sex groups. It could be that the girls in mixed teams had support from the boys in their team who were more familiar with playing digital games. Indeed, in an interview of a girl who played in a mixed group in the second intervention, she said:

There wasn't really a leader but we, I think after a few days, we kinda thought that Zach was the leader cause he just suddenly became the leader without anyone noticing because he was the one telling us all the tricks into getting like more food or tricks into making the employees work to create resources for you, *yah* so he was like the leader, sort of leader, the figurehead in our group. And he always be the one who help us like if we have the money he would be the one like, oh gaining more money by getting more countries and he'll be the one going like how about we do this now, how about we do that now, he'll be the one helping us throughout the whole game.

To encourage girls to spend more hours playing digital games, they could be put in in mixed groups where there is a tendency for girls to participate more in the game. Girls might also benefit from having support staff who could help them with the technical aspects of the game.

Design of Game

The girls in the second intervention played significantly more frequently than the girls in the first intervention. This is not the case for the comparison between game play time for boys in the first and second interventions. It could be that a game design that required more collaborative play among team members resulted in the boys teaching the

girls how to play the game as the team's results are at stake, not the individual's. Future digital games could take this design feature into consideration.

Quality of Student Work

In this study, no differences were found between the quality of student work between boys and girls in the first and second interventions. This result, despite there being significant gender differences in game play time, could be due to other factors that determine learning outcomes. One of these factors is participation in discourse to make meaning of experience, a key element in our Play-Between-Worlds model as explained earlier in this paper. It could be the girls played enough to experience what it was like to be a governor in the game world of Velar and participated in discussions in the fictional world of Bellalonia so that the quality of student work of the girls was on par with that of boys. Boys, on the other hand, might have chosen to spend more time playing *Statecraft X* because they were more motivated to do so. As Hamlen (2010) noted in her study involving elementary school students, "boys choose to play video games more, which in turn elevates their confidence in their abilities regarding game play, and the confidence provides further motivation for playing more" (p. 303).

However, she did caution that such game play might compromise children's ability to self-regulate and succeed in traditional academic environments because children engaging in game play experience constant rewards cycles as motivation and may find it difficult to practice delayed gratification in relation to academic work. Therefore, it might be prudent to limit game play time in educational settings as the present study indicates that there is no significant difference in learning outcomes between the boys and girls in terms of the quality of their work. Students can instead spend more time in academic-related work based on the game.

Thus, the result that there were no differences in the quality of student work between the boys and girls suggests that there are factors, besides game-play time, that determine learning outcomes. One of these could be participation in discourse which can make a difference in the way students interpret their experiences in the fictional world of our Play-Between-Worlds model. Further qualitative analyses of the online and classroom discussions, and blog posts will be needed to shed more light in this area.

Conclusion

The results of this study suggest that in the second intervention, changes made to the game design of *Statecraft X* led to significantly more game play time for girls. Thus, girls showed more interest in playing the game in the second intervention. For the two interventions, girls who played in mixed teams spent more time in game play those in single sex teams. Having mixed-sex teams leads to girls spending more time in game play as this allows them to get help from others, who are usually boys, who are more skilled in digital game play.

To design a game-based curriculum for instructional and educational practices, game design that requires collaboration within a team and grouping girls with boys in teams seem to encourage more game play for girls. Such a curriculum might result in girls immersing themselves more in digital literacy practices, which are desirable in the twenty-first century workplace. These practices may also lead to a rise in female participation in the field of digital design technology.

Acknowledgements

The National Research Foundation, Singapore, provided funding for the research reported in this paper through grant number NRF2007-IDM005-MOE-007CYS. We thank the Principal Investigator of the research project, Prof. Yam San Chee for having given us the opportunity to be part of the research team, and the Learning Sciences Lab, National Institute of Singapore, Nanyang Technological University for the rich research-oriented environment that it provided for us. We also acknowledge and thank other team members who contributed to this work: Ahmed Hazyl Hilmy, Liu Qiang, Eric Salim Lim, Daniel Gan, Rave Tan, and Aldinny Abdul Gapar.

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Appendix

	Level 1	Level 2	Level 3	Level 4
Criteria	1-5 marks	6-10 marks	11-15 marks	16-20 marks
Relevance	<p>Policies proposed are not relevant to the social and economic needs of the country.</p> <p>Most examples given are simplistic. Do not diverge from the textbook.</p>	<p>Examples given may include a non-textbook source or an innovative interpretation.</p> <p>Examples given may include a non-textbook source or an innovative interpretation.</p>	<p>Policies proposed meet the social and economic needs of the majority of the population.</p> <p>Examples given are appropriate and include non-traditional sources.</p>	<p>Policies proposed meet all the social and economic needs of this country.</p> <p>Examples given effectively support all the policies proposed. Examines examples given for its relevance.</p>
Perspective	<p>Offers only the textbook perspective.</p>	<p>Limited discussion of perspectives other than the textbook perspective. Alternatives are not integrated.</p> <p>Treats other viewpoints superficially.</p>	<p>Offers multiple perspectives, but they are integrated in a limited way</p> <p>Attempts to investigate viewpoints.</p>	<p>Integrates diverse multiple relevant perspectives.</p> <p>Multiple viewpoints are thoroughly discussed, explained and qualified.</p>
Personal voice	<p>Is indifferent towards the topic.</p> <p>Does not communicate feelings.</p> <p>Does not offer any opinion.</p> <p>Writing is phony, stilted or awkward.</p> <p>The reader is clueless about the personality of the writer.</p> <p>Voice used is inappropriate for the situation.</p>	<p>Cares about the topic in a limited way.</p> <p>Communicates feelings as an afterthought.</p> <p>Opinions are emergent in nature.</p> <p>Major inconsistencies cast doubt on the authenticity of the piece.</p> <p>The reader has to examine the piece carefully for an indication of the writer's personality.</p> <p>Voice used matches the situation at times.</p>	<p>Cares about the topic.</p> <p>Communicates feelings.</p> <p>Opinions are outlined.</p> <p>A few inconsistencies in the piece.</p> <p>The reader gets a glimpse of the writer's personality.</p> <p>Voice used largely matches the situation.</p>	<p>Cares deeply about the topic.</p> <p>Communicates strong feelings and honest statements.</p> <p>Only the writer could have written it. Opinions are well defined and detailed.</p> <p>Writing is authentic. The writer's voice is consistent throughout the essay. The writing sounds real.</p> <p>Displays a well-developed personality. The reader has the impression that he is getting to know the writer very well.</p> <p>Voice used matches the situation very well.</p>

Figure A1. Rubric for scoring relevance, perspective, and voice in students' essays.

Imagine that you are running for an election to be a member of parliament and that you have to formulate policies to convince the citizens of your country that you are the best candidate. Justify your proposed policies by using examples from what you have learnt, what you have read, and your personal experiences

I think that I am the best candidate because I always listen to the citizens' needs. I will do the best that I can to keep them happy and will also care about their well being. This is the most important part of being a member of parliament. Without happiness, citizens will most likely rebel against the government and this may lead to work strikes. This will indirectly lead to low economic growth and thus falling into poverty. Without a good medical care service, citizens may be vulnerable to serious illnesses such as bird flu or SARS. As the saying goes, 'Prevention is better than cure'. By living a healthy lifestyle, very few citizens will be sick. I can play my part in the subsidies of medicine and hospital fees so that all will get good treatments from doctors and nurses with having to pay just 50% of the price.

I have learnt that by keeping the country safe from any external attacks such as war, we need to have strong defense. By having a strong defense, no country would want to or will think twice before declaring war. This could also make the citizens happy which is more important because they would feel safe by the defense that the country provides. I will try my best to make a strong defense and also commercialize this so that the citizens will know that the country would be safe from any attacks either by all-out war or by terrorist attacks.

I think that these 3 factors could make the country progress and a prosperous country is the outcome if these factors are being carried out efficiently.

Figure A2. A sample of essay instructions and student essay in the second intervention.

Table A1

Mean, SD, and F-Values of Hours Spent per Week for Male and Female Students in First and Second Interventions

Intervention	Gender				<i>F</i>	<i>p</i>
	Male		Female			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
First	19.20	15.25	7.35	6.87	8.50	.009
Second	34.42	25.20	16.13	11.78	5.69	.027

Table A2

Mean and SD of Hours Spent per Week for Same-Sex and Mixed Groups in First and Second Interventions

Group	Gender	<i>M</i>	<i>SD</i>	<i>n</i>
Intervention 1 Boys	Male	27.23	20.24	5
	Total	27.23	20.24	5
Intervention 1 Girls	Female	5.25	4.40	10
	Total	5.25	4.40	10
Intervention 1 Mixed	Male	15.55	11.75	11
	Female	8.86	8.01	14
	Total	11.80	10.19	25
Intervention 2 Boys	Male	27.75	28.16	8
	Total	27.75	28.16	8
Intervention 2 Girls	Female	11.81	10.20	8
	Total	11.81	10.20	8
Intervention 2 Mixed	Male	37.08	22.76	8
	Female	19.00	12.29	12
	Total	26.23	19.00	20
Total	Male	25.81	21.56	32
	Female	11.34	10.30	44
	Total	17.43	17.46	76

Table A3

Comparison of Frequency of Scores of Raters A and B across First and Second Interventions

Score	Intervention 1		Intervention 2	
	Rater A	Rater B	Rater A	Rater B
Relevance				
Level 1	7	5	1	3
Level 2	14	12	2	9
Level 3	14	18	23	22
Level 4	6	6	8	0
Perspective				
Level 1	4	6	0	0
Level 2	11	8	6	5
Level 3	22	19	21	28
Level 4	4	8	7	1
Voice				
Level 1	2	2	0	0
Level 2	11	7	4	6
Level 3	14	19	12	21
Level 4	14	13	18	7

Table A4

Agreement Rates of Scores of Raters A and B in First Intervention

Score agreement	Relevance		Perspective		Voice	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Exact	24	59	22	54	15	37
Adjacent	14	34	19	46	17	41
Non agreement	3	7	0	0	9	22
Exact and adjacent	38	93	41	100	32	78

Table A5

Agreement Rates of Scores of Raters A and B in Second Intervention

Score agreement	Relevance		Perspective		Voice	
	<i>n</i>	%	<i>N</i>	%	<i>n</i>	%
Exact	16	47	22	65	14	41
Adjacent	13	38	11	32	18	53
Non agreement	5	15	1	3	2	6
Exact and adjacent	29	85	33	97	32	94

Table A6

Summary of Means, Standard Deviations, 95% Confidence Intervals for Scores on Relevance, Perspective, and Personal Voice in First and Second Interventions

Variable	Intervention 1				Intervention 2			
	<i>M</i>	<i>SD</i>	95% <i>CI</i>		<i>M</i>	<i>SD</i>	95% <i>CI</i>	
			<i>LL</i>	<i>UP</i>			<i>LL</i>	<i>UP</i>
Relevance								
Male	10.88	4.79	8.42	13.35	12.71	2.30	11.39	14.04
Female	11.21	3.82	9.59	12.82	11.65	3.12	10.19	13.11
All	11.07	4.20	9.75	12.40	12.09	2.82	11.00	13.07
Perspective								
Male	11.41	4.02	9.35	13.48	13.21	1.81	12.17	14.26
Female	11.50	3.89	9.86	13.14	11.70	2.27	10.64	12.76
All	11.46	3.89	10.23	12.69	12.32	2.20	11.56	13.09
Voice								
Male	14.88	3.59	13.04	16.73	14.36	3.56	12.30	16.42
Female	14.13	2.82	12.94	15.31	13.75	2.57	12.55	14.95
All	14.44	3.14	13.44	15.43	14.00	2.98	12.96	15.04

Note. *M* = mean; *SD* = standard deviation; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit.

Table A7

F-Values of Relevance, Perspective, and Personal Voice for Male and Female Students in First and Second Interventions

Variable	Intervention 1		Intervention 2	
	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
Relevance	.000	.986	1.31	.261
Perspective	.17	.683	4.67	.038
Voice	2.54	.120	.30	.591