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The Effects of Virtual Environments on Decisions

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The Effects of Virtual Environments on Decisions

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Abstract

This study investigated decision making in virtual group environments. Graduate students responded to a poll question before and after a virtual group discussion intervention. Actions were employed to mitigate groupthink, including breakout rooms and anonymous responses. Students responded to poll questions during different lessons. Although there was no significant difference between pre-post-trial response choices, there was a significant difference for response times between pre-post trials. Chi-test results of mean response times show a significant relationship between question type and time. The study extends current research in two ways by comparing 1) pre-post group discussion responses and 2) pre-post response times.

Keywords: decision-making, cognitive biases, polls, information processing

The Effects of Virtual Environments on Decisions

Even though there is a growing interest and reliance on virtual and digital tools for educational and business meetings, there is a dearth of studies on decision-making in virtual environments. Decisions are vulnerable to cognitive errors, biases, and factors that contribute to groupthink that result in decision errors (Sustein & Hastic, 2014).

Current survey findings suggest differences in response by mode, such as phone, web, or paper that impact comparisons across modes (Kennedy, 2019; Marlar, 2018). The advances of digital technology and adaptations across domains raises concerns about the impact of polling modes on decision-making and interpretations, especially those involving moral judgments (Suter & Hertwig, 2011).

Problem

Decision-making gleaned from online environments presents new concerns about interpretation in part due to the increase use of technology tools, including polls, and surveys. Social interactions, signals, and dynamics in virtual environments are not equivalent to classrooms or shared spaces (Bailenson, 2021).

Theoretical Framework

The theoretical framework for this study relates to **cognitive information processing**. Cognitive biases and contextual conditions influence individual and group opinions or decision making. Biases, such as confirmation bias, anchoring bias, and availability heuristic may result in cognitive errors or flaws in judgement. Additional sources of bias relate to in-group and out-group biases, leader influence, and cascading effects (Sustein & Hastic, 2014).

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Significance

This study advances our understanding of group decisions by comparing classroom and virtual groups. The results reveal the importance of polling mode and response times for choices and the nature of questions, especially those involving emotion and attitude. Such differences in mode, question type, and environment may impede accurate comparisons and interpretations.

Literature Review

Approximately three million people responded to user-generated surveys each day deployed by SurveyMonkey (2017). The increase of online classes since the pandemic gave rise to more survey tools and reasons to seek new data. Educators use polls to gauge student comprehension, adjust lessons, provide feedback, seek opinions, and as formative assessments (Cornell University, 2022). There is a compelling reason for educators to use polling tools to enhance student attention, engagement, and learning (Sun. 2014). Surveys show that 59% of students are willing to use their phones for polls during class (Survata, 2017).

Mode

Pew Research Center (Keeter, 2015) findings showed statistically significant mode effects between telephone and web poll questions. Greater differences were found for specific types of questions, such as opinions about quality of life. Fewer respondents reported financial troubles on the phone than a web survey, and the largest differences were attitudes about political figures, yielding more negative ratings via the web (Keeter, 2015). Support for capital punishment was 9-10 percent higher for Pew web surveys compared to phone interviews (Daniller & Kiley, 2021). Nevertheless, attitudes about the death penalty have been stable since 1996 for both phone and online surveys (Daniller & Kiley, 2021).

Surprisingly, mode differences were greater for Republicans than for Democrats (Daniller & Kiley, 2021). The researchers attribute the differences to social desirability effects for phone respondents, and propose that web or self-administered surveys may be more accurate.

Toure-Tillery and Wang (2022) explored virtuous decision making between paper and tablet that showed people were more charitable when given a paper solicitation vs. digital device and more virtuous if they benefited rather than someone else. The researchers propose that self-identity may be a moderating effect.

Response Time

Bassili and Fletcher (1991) captured response time measurements using computer assisted technology with phone surveys. Response latency times for factual questions range from 1 and 1.4 seconds; simple attitude 1.4 and 2 seconds; and complex attitudes between 2 and 2.6 seconds. Moreover, those categorized as "non-movers" or indicative of attitude crystallization showed shorter latency times in responses compared to "movers" or those who may not hold attitude crystallization (Bassili & Fletcher, 1991). Different types of questions and complexity yield different response times or latencies.

Group Decisions

Group decision making affords advantages, including leveraging cognitive resources, harvesting diverse ideas, and combining efforts. Discussions allow for testing and adjusting ideas to enhance problem solving and decision-making (Bang & Frith, 2017). Discussions can also reveal blind spots and biases that may influence survey or poll responses. Conversely, groups may have negative effects from group biases, including amplification and cascading effects (Bang & Frith, 2017; Sunstein, & Hastie, 2014).

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      Yang et al. (2021) applied a mathematical model to predict the influence of social learners (followers) in examining collective decisions. The model predicted better or worse outcomes based on a critical threshold of group members who get information from others. Another feature included prediction outcomes for "committed minorities" and those who refuse to change their minds despite evidence.

Virtual Communications

      Communicating with screens creates a boundary, thereby narrowing cognitive focus and visual field (Brucks & Levav, 2022). Virtual participants spent less time looking around the room compared to those in shared physical spaces. Studies also investigated differences in eye contact and gaze in virtual environments. When two people look at each other's eyes with screens, the people do not appear to recognize that they are making eye contact. The screen effect on eye contact and gazing may affect communication patterns and social connections.

      Interpersonal communication processes may also be affected by visual and spatial behaviors that disrupt signals and cues for taking turns and smooth coordination. Turn-taking differs in temporal coordination in virtual environments using screens compared to physically shared, personal conversations (Levinson & Torreia, 2015). Screens create a different interpersonal context which may affect meaning and interpretation of communication signals.

      According to a study by the Basque research center (Perez, 2017), the brainwaves between two people begin to match during in-person conversations. Brainwave synchrony allows for two people to form a connection when sharing physical space. Future studies will need to compare synchronization when conversing using screens.

      Group members meeting in virtual environments yielded fewer creative ideas compared to group members who shared physical office spaces (Brucks & Levav, 2022). The researchers

posit that videoconferencing inhibits idea generation due to a narrower cognitive focus on screens. Differences in visual, cognitive, and interpersonal patterns during virtual screen communications, suggests that there is more to uncover about the effects on decisions and relationships.

Polls and Surveys

The Student Pulse Survey shows that 59% of students are willing to use their cell phones for polls during class Survata (2017). Educators have been incorporating auto-response clickers for polling and feedback during classroom sessions, to solicit attitudes, feedback, or knowledge checks.

Exposing results of opinion poll responses in real-time may have unintended influences, such as information cascades and bandwagon effects. According to Arnesen et al. (2018), exposure to opinion poll responses may signal an individual to change their opinion or influence response.

Educators use web-based polls and surveys to prepare for class discussions or for pre-posttest measures of knowledge comprehension. Sun et al. (2013) studied different ways of incorporating polling and the effects on student engagement and learning of college students. Results showed affordances for using both web-based polls prior to class and auto-responses during class. Although preparatory questions allow for refection prior to discussion, there are few studies that compare attitudes or opinions before and after group discussions, especially from confidential and anonymous surveys.

Methodology and Samples

This study includes two phases to examine differences between virtual and classroom decisions following small group discussions. Phase 1 represents the virtual group while Phase 2

the classroom group. To test the differences between environments the following hypotheses were tested:

H1: *Student responses before group breakout discussions will show significant differences in choices compared to poll responses after group discussions.*

H2: *Student responses will show significant differences and variation between question types.*

H3: *Poll responses that follow group discussions will be significantly different between classroom and virtual environments.*

Phase 1, Virtual Group

The virtual sample was a convenience group of 31 graduate students, 16 males and 15 females, enrolled in a remote course. Virtual classes were delivered using the university Learning Management System that included video capabilities for weekly synchronous class sessions and breakout rooms. The poll questions corresponded with course lesson topics involving ethics and diversity.

Two separate types of poll questions were presented to students with about one month interval between questions (Table 1). The first question about cheating was not expected to evoke a response with emotional valance as expected by the second question, registering women for the Draft.[1]

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[1] The poll question about women registering for the Draft was presented to students prior to the invasion of Ukraine by Russia and U.S. midterm elections.

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Table 1

Poll Questions

Question	Choice
What percentage of undergrad students admit to cheating?	10, 20 30, 40, 50, 60% or greater
Men are required to register for Selective Service or the military draft board at age 18.	Yes, No
Should we require women to register at age 18 the same as men?	

Note: One month interval between questions

The students responded to each question individually prior to a synchronous, virtual class session. Poll results were not shared with the students until after responses were collected from both trials. During live virtual class sessions, established teams of approximately six students discussed the question for 15 minutes in virtual breakout rooms. Students responded to poll questions individually, using MS Forms© (anonymous) before and after small group discussions in a virtual environment. The instructor did not join any breakout groups to avoid influencing discussions (Table 2, Step 2). Students responded to the poll the day after class discussion to allow time for reflection and to remove a perceived time pressure.

Table 2

Virtual Procedure — *N = 117*

| Step 1 **Pretest Trial**	Step 2 **Small Group Discussion**	Step 3 **Posttest Trial**
Instrument: MS Forms©	1 day after pretest, 15 min.	1 day after group
Individual, anonymous		

Results - Virtual Environment

The first question asked students to select an estimate between 10-60% or more: *What percentage of undergrad students admit to cheating?* The average frequency rate estimate for the cheating question was 32% pre-test and 35% posttest. A t-test was computed for the Cheating frequency rates to compare poll results before and after group discussions. There was no significant difference ($p > .05$) between the two trials although there were small changes at the lower and higher choices (Figure 1).

Figure 1

Virtual Cheating Rate Responses   N = 58
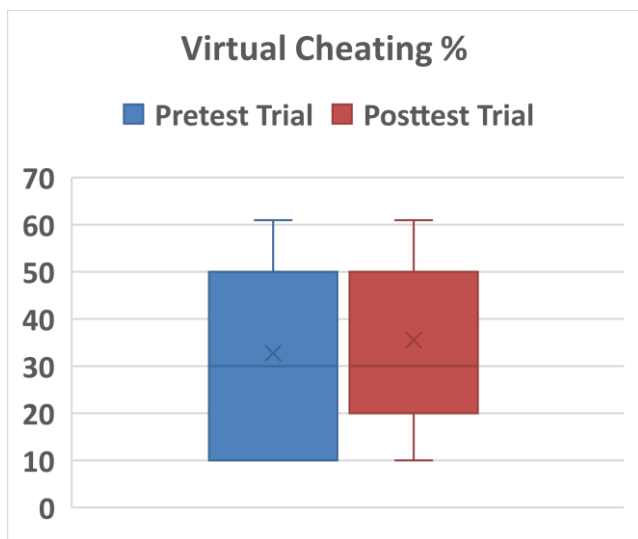
The Draft question was a choice, Yes or No: *Should we require women to register at age 18 the same as men?* Graduate students completed a pre and posttest for the Draft question that included a small group discussion intervention before the posttest.

The mean frequency for Graduate students was 68% for "Yes" in support of women registering for the draft for pre and posttest responses. Graduate students support for drafting

women were higher compared to a national opinion survey that reported support at 45%, which

decreased significantly since 2016 when the highest rate was 63% (Ipsos (2021).

The pre and posttest responses to the Draft question were compared to determine if there

were differences related to small group discussions that occurred prior to the posttest. A chi-test

for pre- and post-trial responses for the Draft question was not significant ($p = >05$), therefore

not supporting **H₁**, *Student responses before group breakout discussions will show significant*

differences in choices compared to poll responses after group discussions. (Figure 2).

Figure 2

Virtual Draft Responses $N = 59$

Virtual Draft Q

	YES	NO
■ Pretest	21	10
■ Posttest	19	9
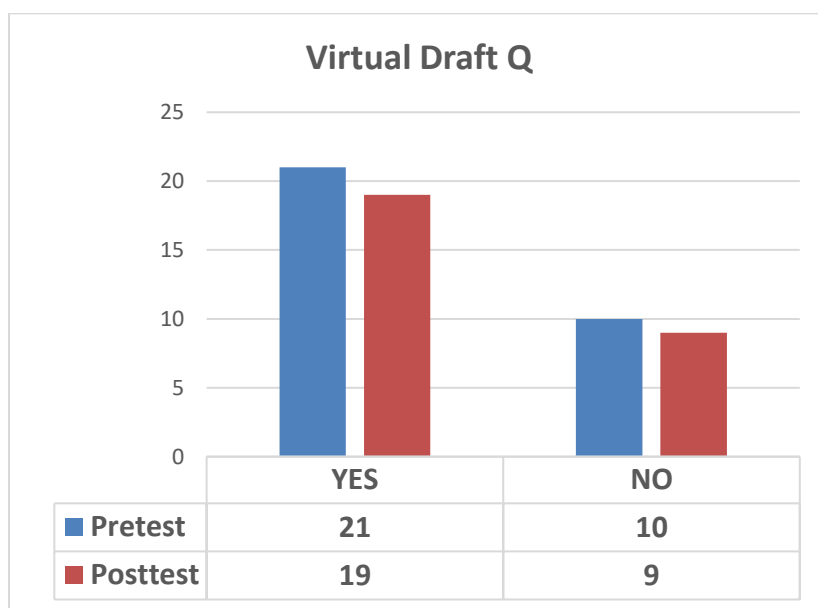
Hypothesis two sought to examine differences in response types between each of the poll

questions: **H₂:** *Student responses will show significant differences and variation between*

question types.

A comparison of the overall average response times or lapses for each question and for pre

and posttest trials was computed. A chi-test of student response times for each question shows a
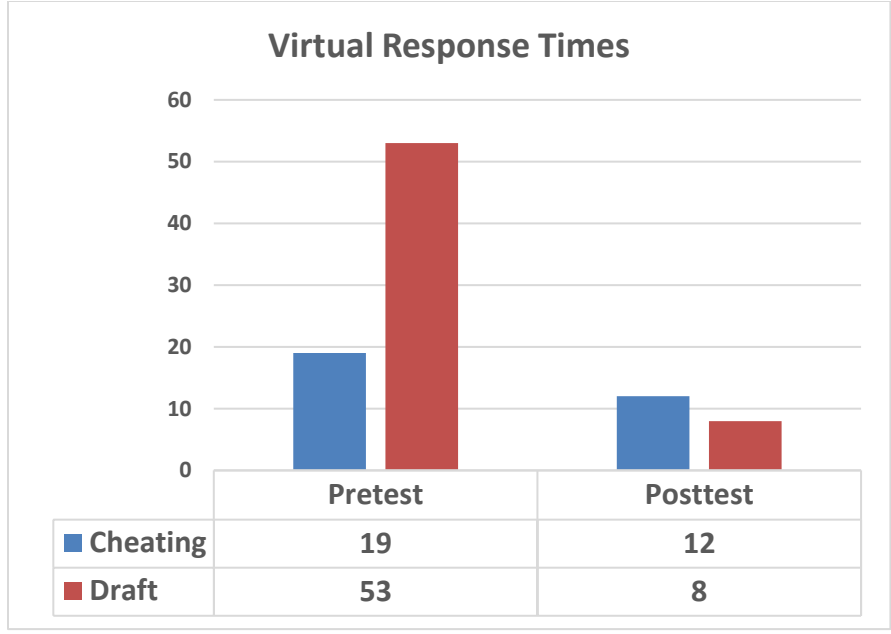
significant difference: $X^2 = (1, N=92) = 7.914$, $p < .01$); r = .37, and Cramer's V indicates a small

effect (Figure 3).

Figure 3

Virtual Draft Response Times $N = 59$

Note: Response times in seconds (p=<0.01)

There is a significant difference of average time response for the Draft poll compared to

the Cheating question in support of H_2 (Table 3).

Furthermore, the posttest response time for the Draft showed a much greater decrease

from the pretest response time compared to the Cheating response times.

Table 3

Virtual Response Times   *N = 117*

Virtual	Cheating Question	Draft Question
Pre-trial	19	53
Post-trial	12	8
Change	-37%	**-85%**

A separate poll question from a small group of Coast Guard community of practice members (n = 22) was used to compare response times with a value-neutral and simple question. The group explored different backgrounds and colors for MS Forms© to use for polls.

The mean response time to the question, "*How cool is this poll*?", was 11 seconds. Table 4 depicts a comparison of response times of the Control with the Cheating (12 seconds) and Draft questions (8 seconds).

Table 4

Virtual Response Times   *N = 139*

Virtual	Cheating Question	Draft Question	Control
Pre-trial	19	53	11
Post-trial	12	8	
Change	-37%	**-85%**	

Phase 2, Classroom Group

The final hypothesis sought to compare post-discussion responses between virtual and classroom environments, **H₃:** *Poll responses that follow group discussions will be significantly different between classroom and virtual environments*.

Classroom Methodology and Sample

A convenience group of 21 male adult military students enrolled in a classroom-based leadership course responded to the prompt, *Should we require women to register for the draft at age 18 the same as men?* The method for the classroom group followed a similar process as the virtual groups, comprising a sequence of pre-trial, discussion, and post-trial.

Classroom students responded to the pre- and post-trials using paper rather than the survey tool that was used for the virtual groups (Appendix 1). Each student was given two copies of the prompt, one for responding to the question prior to the discussion and a second prompt paper for the post-discussion response. Student responses for the pre-trial were collected prior to the small group discussion. After the 15-minute discussion, students responded to the posttest.

Table 5

Classroom Procedure *N=42*

Draft Question	Pre-Trial	Discussion	Post-Trial
Classroom	Individual Response Paper-1	Group Discussion 15 min.	Individual Response Paper-2

Results - Classroom

Classroom responses to the Draft questions was compared to virtual responses. Both groups responded to the Draft question before and after a small group discussion to determine if there

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was a difference for environment as stated in **H₃**: *Poll responses that follow group discussions*

will be significantly different between classroom and virtual environments. Figure 4 displays the

classroom responses for pre- and posttest trials for the Draft question.

Figure 4

Classroom Draft Discussion $N = 42$

	Yes	No
■ Class-Pre	14	7
■ Class-Post	15	6
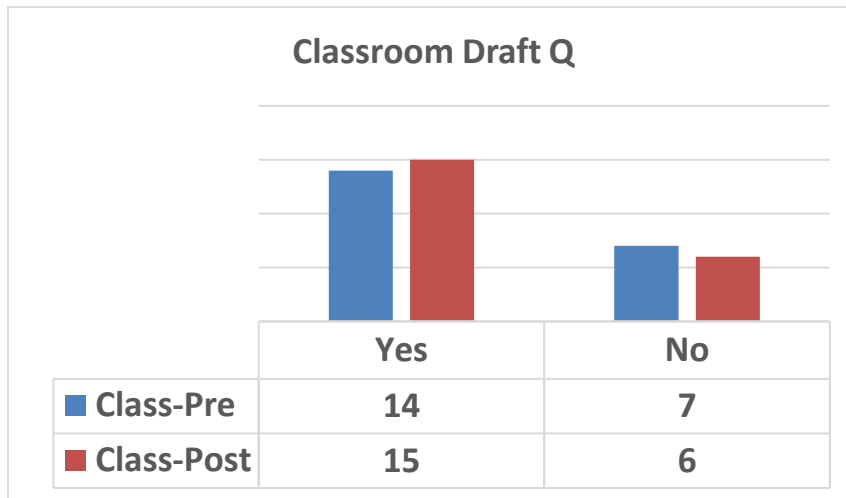
Results for the classroom are similar to the results for the virtual environment and chi-test

results that compared the groups did not show a significant difference. Although there were three

response changes following the discussion within the classroom group, the changes were not

significant. A comparison of responses to the Draft question between the virtual and classroom

groups indicate a similar pattern as shown in Table 6.

Table 6

Draft Yes Response   *N = 101*

	Virtual Yes	Classroom Yes	Control, Ipos
Pre-trial	68%	67%	46%
Post-trial	68%	71%	

*Note: N =*101; Virtual n = 31, 28; Class n =21, 21

Conclusion

This study investigated differences in student responses in virtual and classroom environments and tested for significance within and between groups. Responses were compared for differences for decisions, time lapse for responses, and between types of questions.

A surprising result was the significant difference in time lapse between pre and posttest responses and between types of questions with the virtual group. The Draft question had a longer response time for the pretest than the Cheating question and less for the posttest. Response time results show a decrease of 85% for the Draft question compared to a decrease of 37% for Cheating.

The responses to the poll questions for the virtual and classroom groups were both confidential and anonymous to avoid disclosure. Virtual students did not view live poll results to prevent social comparisons. Classroom students responded to the pre- and post-trial prompts individually and submitted answer sheets to the researcher upon completion.

It is noteworthy that the responses show a similar pattern despite differences in sample sources (grad students vs. military), environment (virtual vs. classroom), collection tools (MS Forms© vs. paper), and interval times following discussion (one day vs. 15 minutes).

Discussion

This inquiry explored decision-making in virtual and classroom discussions that included small group discussions as a treatment intervention. Collecting pre and posttest responses with small discussions provided data for comparing the influence of group discussions for both virtual and classroom groups. Furthermore, the virtual and classroom group results were compared with national poll data that did not include a pre and posttest with discussion.

Small breakout group discussions of established teams for both virtual and classroom comprised approximately six students. This created a space for leveraging diverse cognitive resources, perspectives, and opportunities to adjust cognitive assumptions. Virtual students responded privately to the poll question, and at a time of their choice prior to class and group discussions, which removed a potential time pressure that could emerge during in-class polls.

Several interventions were included to mitigate adverse influences from biases and groupthink behaviors and decisions (Sunstein & Hastie, 2014). For example, influence from the leader was removed and student responses were confidential and anonymous. The instructor shared the final results after students responded to both questions and following small group discussions for both virtual and classroom environments. Furthermore, withholding poll results until the poll closed removed time pressure and mitigated a herding or cascading effect.

Virtual group discussions and decisions were compared with classroom environments to test for differences in group discussions relating to interactions and synchrony, within and between groups, and using different collection tools (digital vs. paper). This study is unique by examining virtual group decisions that include: 1) time intervals, 2) measuring response times, and 3) comparing question types. The incorporation of anonymous polling tools with time intervals was

deliberate to provide opportunities for reflection. The comparison of pre-post discussion

responses sought to examine changes in opinions and time lapses for responses and comparisons

within and between question types. Furthermore, this configuration allowed for comparisons in

data collection tools between digital and paper.

Using a poll or survey tool that measures response times may reveal indicators of attitude

stability or crystallization. As indicated by the results, the Draft question evokes a different

emotion and attitude compared to estimating the rates of admission to Cheating. Students took

longer time to think about the question for the pre-discussion Draft response compared to the

Cheating question, but less time for the posttest Draft response compared to Cheating.

Student response choices did not show significant differences after a group discussion for

either type of question. The lack of difference in response choices may be partially due to

mitigation efforts, such as anonymity, time for reflection, and removing the instructor's influence

during group discussions in both virtual and classroom environments.

The study also considered time responses for each type of question involving different

attitudes and values. Time response data for each type of question indicates a significant

difference between question types and a difference between pre and post trials between and

within question types. The Draft choice results showed less variation in means compared to the

Cheating question but greater variation in time response between pre and post trials. Differences

in time lapses may be explained as attitude crystallization or stability as reported by prior poll

studies (Bassili &Fletcher, 1991).

In appraising the results for the virtual and classroom groups, responses to the Draft question

for both groups show stability before and after discussions, despite the differences in time

intervals. The virtual group responded to the posttest the following day whereas the classroom

group responded to the posttest following the 15-minute discussion. The lack of influence from

group discussions regardless of environment or time interval may be explained by attitude

crystallization (Bassili &Fletcher, 1991). The nature of the topic is value-laden and may be more

stable compared to a simple question without emotional valence.

Another interesting observation is the similarity in overall percentage of agreement that

women should register for the Draft for both environments. Despite differences between

samples, that is, graduate students for the virtual and military students for the classroom

environment, results were comparable. Furthermore, the graduate group was 50% male, whereas

the military was 100% male.

This raises questions about possible contributing factors that explain the similarity of

responses (68%) for the Draft question between these groups. Perhaps network analysis,

specifically negative sentiment, may partially explain the similarity of these two groups. The

military and educational groups reinforce expectations concerning a respectful tone during

discussion and discourse, thereby presenting a buffering effect against polarization. According to

Buder et el. (2021), a combined approach of network and sentiment analysis may explain attitude

polarization. Negative tone, especially those used by the speaker, was more strongly related to

polarization compared to negative tones by colleagues. If both groups experience group

discussions that mitigate negative tone, this may spillover to discussions without instructor or

leader monitoring.

Moreover, the experiences of the graduate learners were similar to military adults who work

with diverse colleagues and communities. Nevertheless, it is surprising that both sample groups

had higher support for drafting women (68%) compared to the national survey (46%) by Ipsos

(2021).

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Limitations

The obvious limitation of concern relates to the sample size and representation. A larger sample size may reveal a different pattern. In addition, a similar study may yield different results based on educational level, affiliations, or with using different devices.

Implications for Educators

Although educators use polls in virtual and classroom settings to enhance engagement and learning, there is a dearth of research about the effects on learning and performance. There may be affordances and limitations for different types of questions, context, and purpose, such as comprehension checks vs. opinions. Considering the extent of virtual classes, there are opportunities for educators to investigate polls in various conditions.

It is important to be deliberate with employing the use of polls in order to optimize learning and interpret data accurately when comparing different polling conditions. Moreover, educators must consider the time allowed to respond to questions, especially if deployed during class sessions. Another consideration is the effect of displaying real-time results, especially in a shared classroom space compared to a virtual session. There is a need to understand how conditions influence the accuracy of responses and to examine the effects of poll questions in different environments and configurations, including small group discussions.

References

Arnesen, S., Johannesson, M. P., Linde, J., & Dahlberg, S. (2018). Do polls influence

    Opinions? Investigating poll feedback loops using the novel dynamic response feedback

    experimental procedure. *Social Science Computer Review, 36*(6), 735–743.

    https://doi.org/10.1177/0894439317731721

Bailenson, J. N. (2021). Nonverbal Overload: A theoretical argument for the causes of Zoom

    fatigue. *Technology, Mind, and Behavior, 2*(1). https://doi.org/10.1037/tmb0000030

Bang, D., & Frith, C. (2017). Making better decisions in group. *Royal Society*. *Open Science,

    4*(8). https://doi.org/10.1098/rsos.170193

Bassili, J. N., & Fletcher, J. F. (1991). Response-time measurement in survey research: A

    method for CATI and a new look at nonattitudes. *Public Opinion Quarterly, 55*(3), 331–

    346. https://doi.org/10.1086/269265

Brucks, M. & Levav, J. (2022). Virtual communication curbs creative idea generation. *Nature,

    605*, 108-112. https://doi.org/10.1038/s41586-022-04643-y

Buder, J. Rabl, L., Feiks, M., Badermann, M.,& Zurstiege, G. (2021). Does negatively toned

    language use on social media lead to attitude polarization? *Computers in Human

    Behavior*,116,106663. https://doi.org/10.1016/j.chb.2020.106663

Center for Teaching Innovation. (2022). *What works: Classroom polling ideas to engage

    students.* Cornell University. https://teaching.cornell.edu/classroom-polling-ideas

Daniller, A., & Kiley, J. (2021, June 2). *Death penalty draws more Americans' support online

    than in telephone surveys*. Pew Research Center. Online surveys find more support for

    death penalty than phone polls in U.S. | Pew Research Center

International Study for Academic Integrity. (2020). Facts and Statistics (academicintegrity.org)

Ipsos. (2021). *Support for drafting women to the military has decreased since 2016*.

https://www.ipsos.com/en-us/news-polls/military-draft-women-support-2021

Keeter, S. (2015, May 13). *From telephone to the web: The challenge of mode of interview*

effects in public opinion polls. Pew Research Center. From Telephone to the Web: The

Challenge of Mode of Interview Effects in Public Opinion Polls - Pew Research Center

Methods | Pew Research Center

Levinson, S. & Torreia, F. (2015). Timing in turn-taking and its implications for processing

models of language. *Frontiers in Psychology*, 6. DOI=10.3389/fpsyg.2015.00731

https://www.frontiersin.org/article/10.3389/fpsyg.2015.00731

Marlar, J. (2018, 25 April). *Why phone and web survey results aren't the same*. Gallup. Why

Phone and Web Survey Results Aren't the Same (gallup.com)

Pérez, A., Carreiras, M., & Duñabeitia, J.A. (2017). Brain-To-brain entrainment: EEG interbrain

synchronization while speaking and listening. *Scientific Reports*, *7*(1).

Doi:10.1038/s41598-017-04464-4

https://www.bcbl.eu/en/research/research-groups/neurobiology-language

Sun, J. C-Y. (2014). Influence of polling technologies on student engagement: An analysis of

student motivation, academic performance, and brainwave data. *Computers & Education,*

72, 80-89. https://doi.org/10.1016/j.compedu.2013.10.010

Sunstein, C. & Hastie, R. (2014, December). The new science of group decision making.

Harvard Business Review. Making Dumb Groups Smarter (hbr.org)

Survata. (2017, December). *Student Pulse Survey. Cellphones in school are essential for*

learning, say students. Top Hat. https://tophat.com/blog/cellphones-in-school-student-
survey/

SurveyMonkey. (2022). *Who responds to online surveys each hour of the day*? SurveyMonkey.

https://www.surveymonkey.com/curiosity/responds-online-surveys-hour-day/

Toure-Tillery, R. & Wang, L. (2017). The Good-on-Paper Effect: How the decision context

influences virtuous behavior. *Marketing Science*. The Good-on-Paper Effect: How the

Decision Context Influences Virtuous Behavior | Kellogg School of Management

(northwestern.edu)

Yang, V., Galesica, M., McGuinness, H., & Harutyunyan, A. (2021, August 26). Dynamical

system model predicts when social learners impair collective performance. *Proceedings*

National Academy of Science, 118(35), e2106292118.

https://doi.org/10.1073/pnas.2106292118

Table 1

Poll Questions

Question	Choice
What percentage of undergrad students admit to cheating?	10, 20 30, 40, 50, 60% or greater
Men are required to register for Selective Service or the military draft board at age 18.	Yes, No
Should we require women to register at age 18 the same as men?	

Note: One month interval between questions

Table 2

Virtual Procedure   *N = 117*

Step 1 **Pretest Trial**	Step 2 **Small Group Discussion**	Step 3 **Posttest Trial**
Instrument: MS Forms©	1 day after pretest, 15 min.	1 day after group
Individual, anonymous		

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Table 3

Virtual Response Times   *N = 117*

Virtual	Cheating Question	Draft Question
Pre-trial	19	53
Post-trial	12	8
Change	-37%	**-85%**

Table 4

Virtual Response Times   *N = 139*

Virtual	Cheating Question	Draft Question	Control
Pre-trial	19	53	11
Post-trial	12	8	
Change	-37%	**-85%**	

Note: Control question, "How cool is this poll?"

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Table 5

Classroom Procedure $N = 42$

Draft Question	Pre-Trial	Discussion	Post-Trial
	Individual Response Paper-1	Group Discussion 15 minutes	Individual Response Paper-2

Note: N = 42; n = 21, 21

Table 6

Draft Yes Response $N = 101$

	Virtual Yes	Classroom Yes	Control, Ipos
Pre-trial	68%	67%	46%
Post-trial	68%	71%	

Note: N = 101; n = 31, 28, 21, 21

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Figure 1

Virtual Cheating Rate Responses
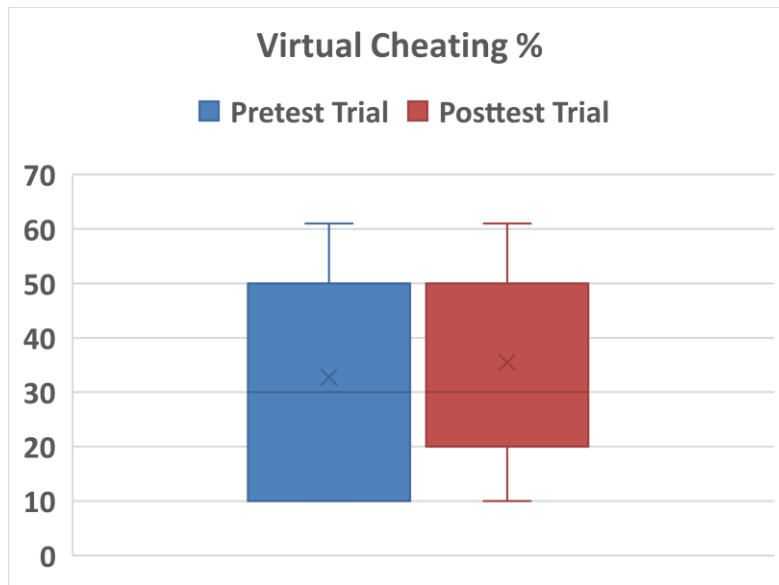
Note: N = 27 Pretest; 31 Posttest

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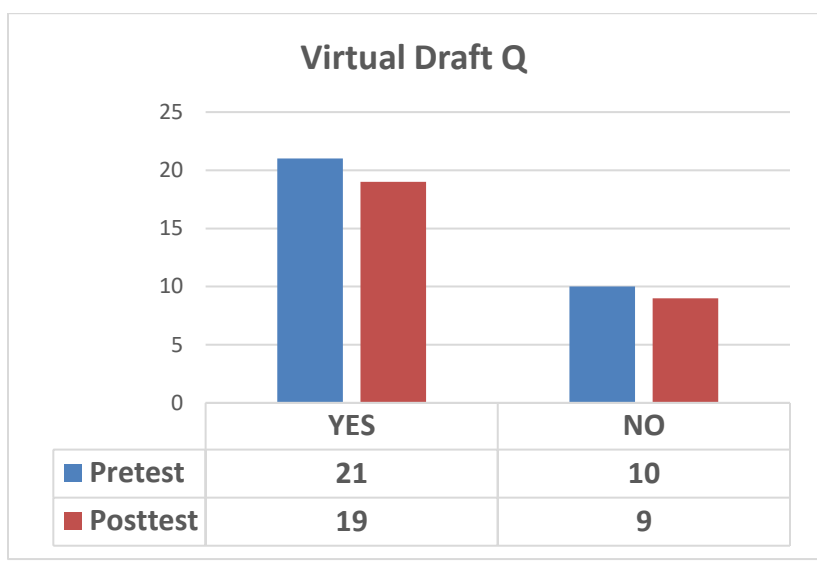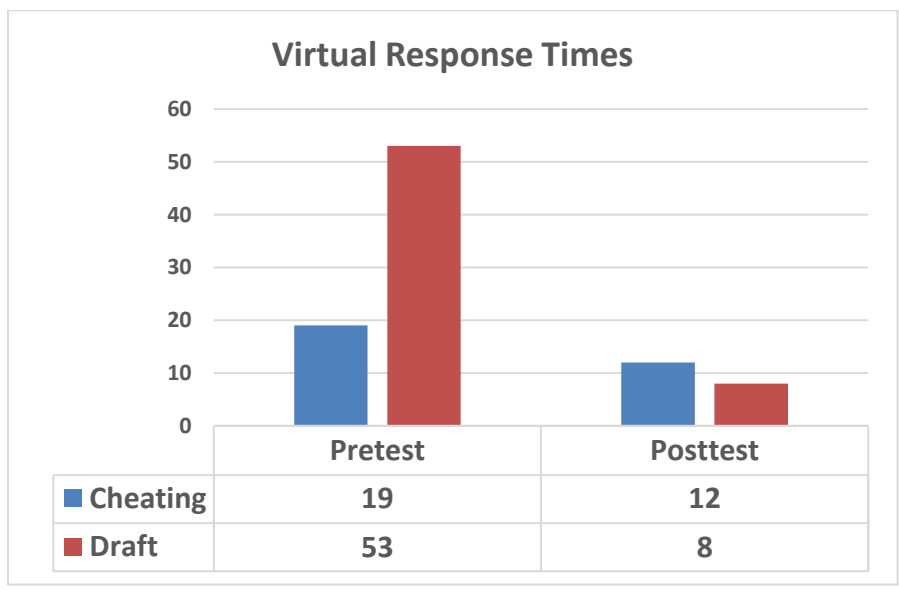**Figure 2**

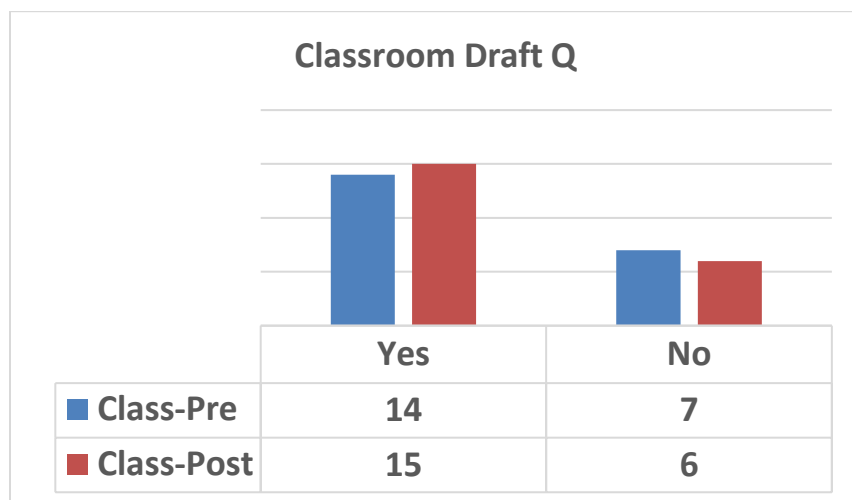*Virtual Draft Responses*   *N* = 59

Virtual Draft Q

	YES	NO
■ Pretest	21	10
■ Posttest	19	9

Figure 3

Virtual Draft Response Times   *N* = 59

Virtual Response Times

	Pretest	Posttest
■ Cheating	19	12
■ Draft	53	8

Note: Response times in seconds (p=<0.01)

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Figure 4

Classroom Draft Discussion   *N = 42*

		Yes	No
■	**Class-Pre**	**14**	**7**
■	**Class-Post**	**15**	**6**

Classroom Draft Q

VIRTUAL DECISIONS

Appendix 1

Classroom Response Form

Your response is voluntary, confidential, and anonymous. If you do not wish to respond, simply return the paper without any response. There is no penalty if you do not participate. There is no specific benefit for participating other than contributing to the overall body of knowledge! Thank you for your participation.

Men are required to register for Selective Service or the military draft board at age 18.

Should we require women to register at age 18 the same as men?

YES_____   NO_____