

When Friends Argue: Investigating Argumentative Learning Processes in Facebook

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Abstract: This symposium addresses how argumentation can be leveraged for learning in social media like Facebook (FB) exemplifying social learning. It catalyzes an international discussion forum (Germany, Israel, United States) that seeks to understand argumentative processes beyond isolated technology-based learning environments, what influences them, if and how they can be repurposed for learning. We aim to contribute to the longstanding interest in argumentative learning in the learning sciences and extend knowledge about analyzing and supporting argumentation processes in FB. We examine the conditions under which FB can be harnessed for argumentative learning. We measure declarative knowledge outcomes and explore the development of attitude and civic behavior. Synthesizing across the papers, we will pinpoint the affordances of FB for argumentative learning, comparing processes to standard learning science approaches and exploring new socially embedded learning outcomes. We will frame promising directions for further research work.

Introduction

Online social network sites (SNSs) like Facebook (FB), are the dominant technology-mediated leisure activity among teenagers in different countries (Rideout, Foehr, Roberts, 2010; Geocartography Group, 2011) and can be seen as exemplifying social learning (Bingham, & Conner, 2010). Online SNSs are defined by the following socio-technical features: 1) uniquely identifiable profiles that consist of user-supplied content and/or system-provided data; 2) (semi-) public display of connections that can be traversed by others; and 3) features that allow users to consume, produce, and/or interact with user-generated content provided by their connections on the site (Ellison & Boyd, 2013, p. 7). As FB is an integral part of high school and college students' routines, learning applications that exploit these routines may help students bridge formal and informal learning by situating social learning opportunities within their everyday social contexts and appropriating peer interactions on both curricular and extra-curricular topics. As such, FB is attracting interest from educators and learning scientists as a potential platform for online learning (Greenhow & Li, 2013; Greenhow, Menzer & Gibbins, 2012).

However, conceptualizing FB as a learning platform, and designing FB applications for learning pose challenges. Researchers have warned against exploiting FB for learning based on postulations about students' multitasking ability (e.g., Junco & Cotton, 2013). Similarly, Kirschner & Karpinski (2010) found a negative influence of time spent on FB and college grades. On the other hand, recent research suggests that *how* FB is used makes a difference in whether academic outcomes are positive or negative (e.g., Junco, 2012). For example, posting status updates and chatting on FB were negatively predictive of GPA, while checking status updates and sharing links were positively predictive (Junco, 2012). Interacting with fellow students around curricular content or other learning-related topics may be expected to be positively associated with achievement, but also with conceptions of learning as becoming part of a practice- or interest-driven community.

In this symposium, we focus on a particular type of learning in FB: learning from peer argumentation (Andriessen, 2006) that has been of longstanding interest to learning scientists. Learning from argumentation has been extensively studied in face-to-face settings (e.g., Herrenkohl & Cornelius, 2013) and in online discussion platforms specifically designed for educational purposes (e.g., Digalo, Belvedere, LASAD, ARGUNAUT, LARGO; Scheuer, Loll, Pinkwart, & McLaren, 2010). However, it has proven difficult to exploit its theoretical potential in already time-strapped classrooms (Sadler, Barab & Scott, 2012) or in formal, course-related e-discussions. As we consider the rich contexts of activity within which people today can create learning opportunities (Barron, 2006), peer groups embedded in social network sites like FB reside outside or are satellites of formal education, and therefore hold promise for facilitating argumentative learning processes — when Friends argue. However, to our best understanding this aspect of argumentation and of SNSs has not been studied yet. The goal of this symposium is, then, to present and synthesize recent research on argumentation and learning from argumentation in Facebook. It synthesizes a set of papers that offer a methodological balance between external and internal validity and either isolate and scrutinize specific characteristics of FB that are

theoretically relevant to argumentative learning in controlled studies, or investigate argumentation in long-term quasi experimental studies, or explore the potential of real FB situations for argumentative learning.

The papers in this symposium focus on various aspects of typical FB interactions like passive vs active argumentative processes, spontaneous vs. solicited participation, private (observing) vs. public communication formats. They study how such interactions affect argumentation processes, learning through argumentation, and how they contribute to learning as personality development. They define instructional support that leverages 'native' social and dialogic FB processes, inspired by existing learning science models, e.g. vicarious learning, group awareness support, and scripting argumentative knowledge construction (Contributions 1, 2 and 4). They investigate how vicarious observing as a common form of passive participation in FB discussions may lead to individual learning and how this learning is, in turn, influenced by rhetoric. They investigate the effects of group awareness support (e.g. the awareness that peers read and critically assess posts) as a main affordance of FB, how this affordance interacts with argumentation scripts, and if FB affordances are compatible with such support (Contributions 2 and 4). They explore how knowledge co-construction and epistemic communication may occur among FB-using youth and form civic behavior (Contribution 3). They investigate how argumentation and social aspects of communication influence declarative and argumentative learning outcomes (Contributions 1-4), but also how they relate to civic engagement and communication competence (Contributions 3 and 4).

Together, the four papers suggest that FB with its social character and broad use offers a unique arena for learning sciences research. Insights on leveraging FB for learning show great potential, but also possible pitfalls. The papers suggest that to describe a framework for using FB as a learning platform, unproductive aspects of FB need to be identified and counterbalanced, and new structures, designed educational features or social supports need to be introduced. For example, disputative argumentative discussions may increase initial interest and draw readers into argumentation processes, but they reduce learning effects in comparison to deliberative argumentative discussions. Group awareness support may engage learners and make them aware of their social context (e.g., that others will interact with their work), but it may induce over-cautious argumentative behavior that hinders learning. Individual preparation may reduce process losses related to the extra overload of simultaneously deliberating on individual arguments and arguing collaborative, but may also reduce knowledge co-construction. Adolescent FB users may perceive FB as more conducive to enacting civic behaviors than they do other online forums, but neither conflict-oriented nor quick consensus building in argumentation around key issues correlates with increases in civic participation. FB discussions may foster learning especially if additional group awareness is supported, in which case communication attitude change correlates with learning.

The contributions in this symposium identify the affordances and tensions mentioned above, helping the field to advance toward understanding argumentative learning processes in a range of contexts. The rich context of FB may host and even accelerate socio-cognitive processes, allowing researchers to log, trace and examine them for the first time, thus offering a breakthrough in scrutinizing influential social learning theories, such as social constructivism (Vygotsky, 1978) and communities of learning (Wenger, Richard McDermott & Snyder, 2002). For example, what are the social aspects that influence learning (e.g. rhetoric style, group awareness, communication competence and attitude)? How do cognitive and social forms of learning interact (e.g. declarative learning gains and communication attitude, argumentative knowledge and civic behavior)? What instructional design can promote this interaction (e.g. deliberative discussions, argumentation support)? As such, the research featured lies at the heart of learning and becoming in practice. Furthermore, given the role of FB and other social media in recent political developments worldwide, understanding such processes might facilitate our own learning to deliberate in these spaces and becoming more engaged learning scientist-citizens.

Symposium Format

An introduction like the first part of the proposal will present the importance of the topic. Then individual papers will raise their central points and controversies, while findings will be used to ground the discussion in empirical results. One aim will be to critically consider and synthesize the different perspectives of the papers, including the generalization of the results and the methods. The discussant, Douglas Clark, will moderate the discussion. Douglas Clark is a leading researcher in the field of collaborative argumentative learning and a developer of new analysis methods of argumentation suitable for online asynchronous discussions. He is, therefore, aptly suited to help us critically assess the value, implications of the work presented to the field, enrich the methods used, and sketch a framework for pursuing the research questions further. The results of the symposium will set a precedent for interested researchers and will help them situate their own research into the proposed framework.

Learning from Reading SNS Group Discussions: Rhetoric Style Matters

Christa S. C. Asterhan, Rakheli Hever and Baruch B. Schwarz, Hebrew University of Jerusalem

While browsing and clicking through the activities of one's FB contacts, FB users are exposed to various types of discussions on a variety of topics, as well as external materials linked from those discussions (e.g., articles, images, multimedia), often including heated discussions on issues of the hour. It would seem that FB as a social

arena is a hotbed of discussion, usually between FB "friends" but also with relative strangers who happen to subscribe to the same group or page, or to read the same article using the FB social plug-in. There is much to be learned from such discussions, even by people who are not themselves contributing posts to the discussion. However, this potential is currently not exploited in educational settings, and, compared to normative models of productive argumentation for learning (e.g., Asterhan, 2013; Keefer et al., 2000), the quality of these discussions may often prove to be sub-optimal. We then focus on whether and how individuals may learn from vicariously observing (that is: reading) online group discussions on a hot topic. Recent research by Wise, Speer, Marbouti and Hsiao (2013) shows that this online 'listening' is indeed a substantial component of students' participation in online course discussions, averaging about 75% of their time across students. The question is whether this also results in learning? Previous studies have reported positive correlations between the number of discussion posts students access and their course achievement (e.g., Morris et al, 2005). However, individual differences (e.g., in prior knowledge, interest and motivation) may account for the covariance between the two variables and a more experimental approach is then called for.

In this presentation, we report on a study investigating the effect of reading a FB discussion with links to external information resources, by comparing it to a control condition in which students only received the online resources. In addition, we investigate the effect of different rhetoric styles in argumentative discourse. Recent experimental research on active participation in computer-mediated argumentative discourse (e.g., Asterhan & Babichenko, 2013) has demonstrated that deliberative argumentation (a focus on critically exploring different viewpoints) leads to superior individual learning gains, compared to disputative argumentation (a focus on undermining the opponents' claims and winning the debate). Taking this a step further, it is expected that rhetoric style would affect learning from *reading* an online discussion. However, expectations regarding effects of reading a disputative *vs.* a deliberative discussion on learning are less straightforward: On the one hand, reading a disputative discussion could lead to higher arousal and increase motivation, without (unlike in active participation) inducing anxiety. On the other hand, the disputative tone may vicariously induce anxiety or cause the reader to invest less cognitively, by which it may have an adverse effect on learning. We then sought to explore how different argumentation styles would affect learning from reading online FB discussions.

Method

A FB discussion was created revolving around a hot topic in Israeli society: Whether legal work permits should be issued for African refugees/asylum seekers/work immigrants (AAs). Twelve existing online articles on related topics were selected to reflect a variety of opinions and aspects. Each discussion contribution contained a claim, argument and/or a question by one of 4 (fake) discussants, as well as a link to one of the abovementioned online resources as support. Based on earlier work (Asterhan, 2013; Asterhan & Babichenko, 2013), two versions were created, with identical content, but differing in argumentative discourse style (see Table 1 for examples).

Sixty undergraduates from a large Israeli university (mean age = 25.10, 13 male) participated in a 1×3 randomized experiment. The experimental session (60-80 *min*) included the following activities: (1) a demographic and an attitudes survey; (2) writing an argumentative essay on AA employment and an attitudes survey; (3) the experimental session (see below); (4) a declarative knowledge test containing closed and open questions on facts from the online resources; and (5) writing another argumentative essay. During phase 3, subjects in the two discussion conditions were told that they were about to read an educational discussion between students as part of their requirements for a Social Studies class, who were instructed to support their arguments using links to online resources. In the control condition, the subjects only received the article titles and links to the articles, along with the source and date of each. The data collected in this study then consisted of 3 online questionnaires, 2 essays (pre and post) and screen-recordings of the subjects' screen actions. In this paper, we report on the effect of the conditions on students' performance on the declarative knowledge test.

Table 1: Excerpt of the FB group discussion content according to two different argumentative discourse styles

	<i>Disputative style</i>	<i>Deliberative style</i>
Ronit:	It's obvious that we have to let the refugees work, so that they can make an honest living and contribute to our society. Otherwise they'll be lying in the streets and will depend on charity or crime in order to have something to eat, and we can see that crime amongst them is really on the rise. [LINK]	I think we should let the refugees work, so that they can make an honest living and contribute to our society. Otherwise I fear they'll be lying in the streets and will depend on charity or crime in order to have something to eat. Unfortunately for us it seems that crime amongst them is indeed on the rise. [LINK]
Limor:	You're talking nonsense! Do you mean to tell me that they commit crimes because they don't have anything to eat? And what about all the rapes we hear about? [LINK]	But perhaps we should think about another solution to crime, because there are all these rape cases we've heard about recently that I'm not sure are related to not having anything to eat. [LINK]

Results and Discussion

No differences were found between the three conditions in students' attitudes towards AIs prior to the intervention, $F < 1$. A 1×3 ANOVA on students' performance scores on the content knowledge test showed a significant effect of condition, $F(2,57) = 6.55$, $p = .003$, $\eta^2 = .187$. Post-hoc tests (with Tukey-Kramer adjustments) revealed that students in the disputative discourse style condition showed less content knowledge ($M = 56.67$, $SD = 12.64$) than both the deliberative discourse style condition ($M = 67.62$, $SD = 8.96$, $p = .016$) and the control condition ($M = 69.52$, $SD = 14.19$, $p = .004$). Performance scores of students in the control and the deliberative discourse style conditions were similar ($p = .873$). Previous studies have shown that participation in disputative (as opposed to deliberative) argumentative discourse is associated with lower individual knowledge gains from verbal interaction (Asterhan & Babichenko, 2013). The findings reported here then further extend these findings to a setting in which students read (as opposed to participate in) disputative discussions. The fact that no differences were found between the deliberative and the control condition seems to indicate that the effect of rhetoric style in argumentation may not be a positive outcome of deliberative argumentation, but a negative outcome of disputative argumentation. It is possible that the disputative discourse style caused learners to adopt more superficial strategies while reading the discussions and the accompanying online resources (Bliuc et al, 2010; Wise et al, 2013). Analyses of the screen-recording data and the argumentative essays are expected to provide further insights into the processes that led to the differences in knowledge gains results, and will be presented at the symposium. In any case, the findings reported here show that vicarious participation in argumentative SNS discussions can have similar effects to reading information sources only, but that particular attention should be dedicated to the rhetoric style of such discussions.

Differential Effects of Scripts for Learning in Facebook: Individual Preparation and Argumentation Scripts

Raluca Judele, Dimitra Tsovaltzi, Thomas Puhl, and Armin Weinberger, Saarland University

As SNS are a natural platform for dialogic exchange, they can be used for learning through argumentative knowledge construction (AKC; Weinberger, Stegmann, Fischer & Mandl, 2007). Scripts are commonly used to enhance knowledge co-construction (Weinberger, Stegman & Fischer., 2007; Fischer, Kollar, Stegmann & Wecker, 2013; Andriessen, 2006) by structuring argumentation in order to help discussants clarify their own ideas and consider new ideas by others. Should scripts also be used to promote argumentative learning in FB, which is associated with informal self-directed learning? To answer this question, the benefits and risks of using scripts in SNS and their potential interactions with SNS affordances have to be clarified. Here we explore two kinds of scripts, individual preparation (where students are granted extra time to prepare their arguments before collaboration) and argumentation scripts, and their effects on knowledge co-construction and outcomes in three studies set up in FB. We look into two implementations of argumentation scripts: In Study 1, an argumentation ontology was implemented in LASAD (Loll & Pinkwart, 2013) to script argumentation prior to discussing in FB (Tsovaltzi, Weinberger, Scheuer, Dragon, & McLaren, 2012). For Study 2 and 3, we built a FB App with typical FB-functions - "like" and "comment" - which implemented the ontology directly inside FB (see Figure 1).



Figure 1. The FB-app with argumentation script

Study 1

This pilot study ($N=40$) analyzed the influence of individual preparation with an argumentation script (LASAD) on subsequent knowledge co-construction discussions in dyads inside FB with a 1×2 design (Tsovaltzi et al, 2012). The results showed that both conditions changed their opinions and general attitude towards behaviorism

as a teaching strategy, $t(39)=8.84$, $p<.001$, $d=1.40$, but there were no differences between groups, $F(1,38)=.09$, $p=.77$. Moreover, both conditions shared more knowledge post intervention, $F(1,18)=19.61$, $p<.001$, *partial* $\eta^2=.52$, which is a strong indicator of transactivity (Weinberger et al, 2007). Although both conditions learned significantly from pretest to posttest, $F(1,38)=87.55$, $p<.001$, $\eta_p^2=.70$, opinion change, as an additional measure of transactivity (Wood, Kallgren, & Priesler, 1985), correlates with knowledge gains only in the condition without argument support. This might be an indication that individual preparation with an argumentation script before collaborative discussion may hinder knowledge co-construction; learners gain knowledge, but not jointly. Is the individual preparation per se or the argumentation script responsible for the missing correlation between knowledge gains and opinion change? Does individual preparation lead to lack of knowledge co-construction?

Study 2

In a 2×2 individual design we examined argumentation scripts and group awareness support in a university course ($N=81$) (Tsovaltzi, Puhl, & Weinberger, 2013). A FB App implemented the argumentation script. Group awareness was supported in the awareness conditions by informing participants that selected arguments would be published in the course forum where they could be assessed, amended or refuted. Such group awareness is a standard FB affordance; when asynchronously creating posts users are aware that their arguments will be assessed, amended or refuted, common practices in FB, but also explicitly “liked” or implicitly “not liked” by an audience with access to personal information about them. Results indicate that all groups learned between pretest and posttest, $F(1,77)=221.73$; $p=.000$, $\eta_p^2=.74$. Helmert contrasts showed that the control was better than the condition with group awareness support only, $t(77)=2.52$, $p=.014$, $d=.86$, indicating negative effects of group awareness support. There were no similar effects for argumentation script. It is possible that group awareness support in individual preparation declines the quality of argument preparation and hinders learning, but argumentation scripts may counteract this effect. How do argumentation scripts influence learning when users are scripted to individually prepare before discussing in FB, where group awareness described above is granted?

Study 3

We tested this question in a 2×2 study with university students ($N=128$), with factors argumentation script (operationalized as in study 2) and individual preparation (Judele, Tsovaltzi, Puhl & Weinberger, 2014). All participants were given instructions to exchange arguments during collaboration and reach a common conclusion, as in standard argumentative collaborative scenarios. Time on task was held constant but discussion differed depending on the condition. Therefore, we relativized our results for time. There was a large main effect on learning gains, $F(1,124)=124.27$; $p=.000$, $\eta_p^2=.50$, but a negative main effect of individual preparation on learning outcomes, $F(1,124)=5.121$; $p=.025$; $\eta_p^2=.04$. There was no main effect of argumentation script, $F(1,124)=0.04$; $p=.847$; $\eta_p^2=.00$. To decipher the effects of argumentation script on learning gains, we compared argumentation script only to individual preparation with argumentation script, which was significant for argumentation script only, $t(124)=2.9$, $p=.005$, $d=0.69$. Moreover, there was a main negative effect of individual preparation for knowledge equivalence (Weinberger, Stegmann & Fischer, 2007), $F(1,60)=4.32$; $p=.042$; $\eta_p^2=.07$. Taken together, these results support the interpretation that individually preparing arguments before collaboration leads to worse learning outcomes independent of argumentation script and that there is less knowledge co-construction for learners with individual preparation.

Interpretation

The negative effects of individual preparation (studies 1 and 3) contradict previous results in computer supported collaborative learning (CSCL). Together with the negative effect of group awareness support (Study 2) they may signify that social aspects (self-presentation and caution) are magnified in the context of FB (even in a closed FB App) with detrimental effects for learning. However, the argumentation script during individual preparation did not counteract these negative effects (Study 3), although it significantly increased learning when provided during collaboration. This difference to standard CSCL findings could also be explained if we consider the socially loaded context of FB. It is plausible that users used the script to prepare well during individual preparation in order not to lose face in the FB discussion. This may have led to undue knowledge solidification rather than preparation for knowledge co-construction. Although further research is on call, these collective results implicate that to leverage FB as a learning platform we need to offer guidance (e.g. argumentation script) but at the same time respect FB affordances like asynchronous dialogic communication.

Argumentation and Civic Engagement in a Facebook App

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Increasingly, learning scientists are exploring the nature of adolescent collaborative learning in a variety of settings such as schools, museums and out-of-school media practices in virtual environments. Socio-cultural learning theory and theories of computer-supported collaborative learning have suggested that such contexts

might be particularly supportive of learning because a considerable amount of learning occurs through informal interactions with others (Brown, Collins & Duguid, 1989). Our work was also framed by the larger discussions surrounding the development of *scientific literacy* (Polman et al., 2010) and *communication competence* (McLeod et al., 2010) as a dimension of civic competence and actual civic engagement. These discussions emphasize learners' integration and validation of information from multiple sources; formulation of arguments; multiple perspective-taking; expression of opinion; making connections between issues that yield more complex issue understanding; actively engaging others in collective action, and multiple routes to civic participation. Thus, the focus of the current study was to examine the links between socio-scientific argumentation, civic communication competence, and civic engagement in a Facebook application.

Methods

Participants in this study were not part of any formal educational program or course but interested in environmental science, as indicated on an initial registration survey. Participants were accessed through substantial marketing efforts and partnership with campus- and school-based environmental groups. Hot Dish (HD) was an open-source FB application designed to facilitate information-sharing, commentary, and problem-solving 'challenges' about environmental science topics. In Hot Dish, users could post original articles or circulate online articles; as well as read, share, vote on, and comment on posted articles. The overall HD community comprised 346 consented participants (ages 16-24) who contributed 3,000+ postings of comments, blog entries, and challenge documentation. This paper focuses on a subsample drawn from the larger HD community based on their participation in commenting on posted stories (n = 31). These participants posted over 950 unique comment strings in response to posted articles across 256 of articles.

The focus of this study was on the comments that users posted in response to articles. We coded for argumentation along six process-oriented *argumentation* dimensions: (1) Counterarguments, (2) Arguments, (3) Integrated Replies, (4) Epistemic skills, (5) Conflict-oriented Consensus Building (COB), and (6) Quick Consensus Building (QCB) (Greenhow, Menzer & Gibbins, 2012; Sadler et al, 2006; Weinberger & Fischer, 2006). Each comment string (unit of analysis) was coded for argumentation, and means were calculated for each skillset at the comment string level. We also coded comment strings for the presence of five indicators of *civic communication competence* (McLeod, et al., 2010): (1) information from multiple sources (INFO), (2) expression of opinion (EMO), (3) learning from peers (LRN), (4) making connections between issues (that presumably yield more complex issue understanding) (CP), and soliciting others' civic participation (SC).

Lastly, users completed problem-solving 'Challenges' (i.e., *civic engagement opportunities*) designed to address environmental issues in users' communities through online or offline activities, such as recycling or signing up for an online newsletter about environmental issues (Heimlich & Ardoin, 2008). There were 56 challenges that each user was invited to complete. Civic Engagement was coded across challenges for four different levels: Platform (online, offline, hybrid); Activity Type (volunteer, activism, individual); Participation Type (expressive statements, civic community participation, campaign political participation, political consumerism), and Citizenship Style (dutiful, actualizing) (Bennett, Freelon & Wells, 2010). Codes outlined above will be described with examples from the data in the final paper and presentation.

Results

Means, standard deviations, and correlations of argumentation and communication competence are presented in Table 2. In terms of argumentation skills, users on average, produced Epistemic skills, followed by Arguments and Integrated Replies; and the relations between argumentation skills varied (e.g., Greenhow et al., 2012). In terms of civic communication competence, most users, on average, produced expressive statements and solicitations for civic engagement.

Table 2: Means, Standard Deviations, and Bivariate Correlations

	1	2	3	4	5	6	7	8	9	10	11
1. Counter-argument	--	.062	-.103***	.214***	.404***	-.117***	.146***	-.136***	-.021	-.121***	.092**
2. Argument		--	-.131***	.304***	.044	-.272***	.084**	-.055	-.069*	-.367***	.305***
3. Integrated Reply			--	.030	-.200***	-.027	.008	-.104***	.024	-.092**	.101**
4. Epistemic				--	.164***	-.375***	.182***	-.049	-.019	-.469***	.212***
5. COB					--	.018	.085**	-.083**	-.046	-.086**	-.060
6. QCB						--	-.042	.051	.040	.348***	-.200***
7. INFO							--	-.075*	.015	-.096**	-.009
8. EMO								--	-.036	.094**	.000
9. LRN									--	-.069*	-.024
10. SC										--	-.343***
11. CP											--

<i>Mean</i>	0.09	0.26	0.22	0.38	-0.05	0.11	0.06	0.39	0.06	0.24	0.36
<i>SD</i>	0.24	0.29	0.42	0.25	0.71	0.31	0.23	0.49	0.24	0.43	0.48

Note: $N = 971$ comment strings. * $p > .05$. ** $p > .01$. *** $p > .001$.

Of most interest were the links between argumentation and civic communication competence. Correlational analyses revealed that using multiple sources of information, an indicator of civic communication competence, was positively related to most argumentation skills. Posted comments demonstrated evidence of argument construction (Greenhow, Menzer & Gibbins, 2012) and multiple sources of information. Another indicator of civic communication competence: solicitations of civic participation found in comment strings, was also positively related to most argumentation skills. Expressing emotions was negatively related to most argument skills, suggesting that ‘heated debate’ was less representative of argumentation skills in this community than in other youth-initiated social network sites (Greenhow & Robelia, 2009).

Across all users, Hot Dish users completed 1173 problem-solving challenges during the 8-week period across 56 unique challenges. Codes regarding the number of challenges comprising each of the four different levels of civic engagement (platform, activity type, participation, and citizenship style) and the number of challenges completed for each type are presented in Table 3.

Table 3: Civic Participation Challenges

Civic Participation Challenges	Number of Unique Challenges	Number of Completed Challenges
<i>Platform</i>		
1. Online	24	466
2. Offline	28	688
3. Hybrid	1	6
<i>Activity Type</i>		
4. Volunteer Activity	17	387
5. Activism	25	586
6. Individual	11	187
<i>Participation</i>		
7. Expressive Participation	28	549
8. Civic Community Participation	8	222
9. Campaign Political Participation	6	163
10. Political Consumerism	10	140
<i>Citizenship</i>		
11. Dutiful Citizenship	11	346
12. Actualizing Citizenship	41	700

Discussion and Implications

Based on prior research, we speculated that argumentation would be related to civic communication competence in various ways. Results reveal the complexity in which argumentation skills are associated with civic communication competence skills. We also speculated that young people’s enacted civic engagement would align less with traditional theories of dutiful citizenship (voting, party or organization activity) and more with new theories of actualizing citizenship (individual activism, issue-oriented activity online) that seem particularly synergistic with the affordances of social media. This proved to be true: Twice the number of civic opportunities coded as actualizing were completed ($n=700$), compared to those coded as dutiful ($n=346$). The final presentation will further discuss our results along these dimensions: socio-scientific argumentation, civic communication competence, and civic engagement in a Facebook application; the links between them, and implications for future work.

Group Awareness and Reflection Scripts: Learning Effects of Facebook-Based Seminar Interactions

T. Puhl, D. Tsovaltzi, and A. Weinberger, Saarland University

Learning in FB may be particularly suited to facilitate online learners’ group awareness, i.e. help them consider the audience and the group processes, like sympathizing with or criticizing. Group awareness seems to be positively related to performance and to process satisfaction of computer-supported learning groups (Phielix et al, 2010). Awareness tools are used to share information about learners, such as individual knowledge (cognitive awareness), group processes or attitudes (group awareness). Awareness can foster positive the collaboration process, especially though controversial computer-supported discussions (Buder & Bodemer, 2008). Scripts have been successful in helping students structure, reflect and discuss their opinions (Weinberger et al., 2007) and promote knowledge co-construction, argumentative and declarative knowledge (Weinberger & Fischer 2006). We tested the effects of group awareness and reflection scripts in FB on learning gains and attitude change in three seminars on communication theory over eight weeks. Learning gains is the standard measure for

cognitive change. Learning as development of personality in terms of attitude change is less commonly connected to formal education, but its importance is recognized in vocational training which includes training on professional attitude and communication, e.g. of medical doctors, lawyers, teachers. Theory on attitude change supports that change is the result of dissonance that can be caused by cognitive (attitude) conflict or conflict between cognition and behavior. Such conflicts can be raised through cognitive perceptions, or cognitive and affective (commonly social) perceptions (Erber, Hodges, & Wilson, 1993; Eagly & Chaiken, 1995).

Methods

A 1×3 quasi-experimental field-study with German teacher trainees ($N=62$) investigated the effects of group awareness with and without a reflection script on learning outcomes and attitude change. During a seminar on communication and interaction, students weekly answered a case-based communication questionnaire with cases from every-day school interaction from the perspective of a teacher. Every scenario included four Likert-scaled answers, two capturing multiple perspectives and flexible attitudes (emphasizing the perspectives of different parties in conflicts), and two answers capturing goal-oriented and structured attitudes (opting for clear directions), rated on a scale from 0 to 12. Every week, before discussing seminar contents in their FB group, the results of the questionnaire were played back to the participants in an awareness tool, a two dimensional graphic within a FB-app, where students could see their own and the group's position depicting communication attitudes. Following Dillenbourg and Hong (2008) the tool was aimed at inducing dissonance between the theories students studied in the seminar and their personal attitude as shown in the tool. To enhance this dissonance, the second experimental group also received a weekly macro script to structure their reflection (e.g. how does my position change?) and the behavioral outcome (e.g. discuss with the person most different from you) of the awareness tool. We hypothesized that more change should occur in the experimental conditions and the direction of change would be more varied in relation to the seminar contents than in the control. In terms of the learning outcome, we hypothesized a main effect of group awareness on declarative knowledge (facts and definitions) and argumentative knowledge (theory-based interpretations and argumentation).

Results

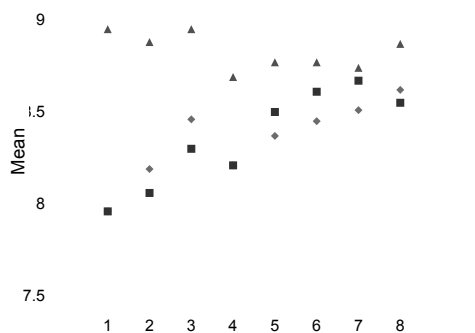


Figure 2. Multiple-perspective / flexible attitude

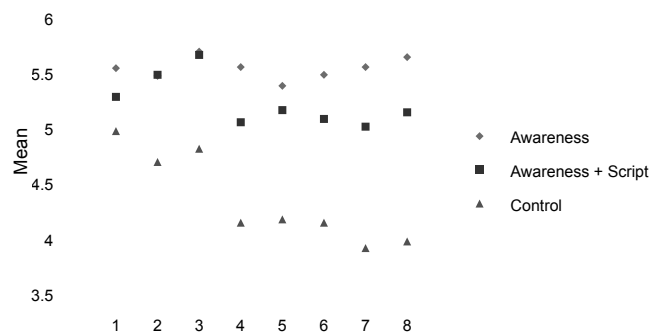


Figure 3. Goal-oriented / structured attitude

There were no significant differences between groups prior to the intervention. Log data confirmed that both awareness groups spent time looking at the graph as an indication of reflection, and that the script condition reflected on their graph position. There is a significant effect for the experimental groups on declarative knowledge, $F(2;59)=6.86$; $p=.002$; $\eta_p^2=.19$, i.e. both awareness conditions learned more about facts and definitions, and. There are no significant effects for argumentative knowledge. An explorative factor analysis identified two factors of communication attitudes. The first factor is a multiple-perspective and flexible way to reflect on and behave in the scenario, the second factor is a goal-oriented and structured way. A repeated measures ANOVA showed a significant effect of the experimental conditions for the factor multiple-perspective / flexible attitude (see Figure 2), $F(2;59)=1.72$; $p=.049$; $\eta_p^2=.06$ and for the factor goal-oriented and structured attitude (see Figure 3), $F(2;59)=1.98$; $p=.018$; $\eta_p^2=.06$. The descriptive statistics show that the experimental conditions score higher in their communication attitude for the first factor. On the contrary, the control, which starts on a significantly higher level in the first week, $F(2;59)=3.26$; $p=.046$; $\eta_p^2=.10$, remains relatively stable over the duration of seminar. The awareness groups started on an average level, changing their attitudes towards more multiple-perspective over the duration of seminar. However, the control scored gradually lower on the second factor until the end of the seminar, whereas the awareness conditions were rather stable in their attitudes. Contrast showed that both awareness conditions changed their attitude from first and to last session significantly on multiple-perspective, $t(59)=2.70$; $p=.010$, which also correlates with learning outcomes on declarative knowledge, $r(61)=.26$, $p=.046$, and the control condition on goal-oriented behavior, $t(59)=2.64$; $p=.011$.

Discussion

As hypothesized, it seems like the increased awareness of one's own position in the graphic increased the dissonance between cognitive and affective state at the individual level, which led to reflection on the seminar topic for the individual, who tried to understand their position (communication type) based on communication theories. At the same time, the awareness of the one's relative position with regard to the seminar group increased the dissonance between cognitive and affective state at the group level, causing students to turn to the seminar material in order to mutually explain and understand differences and similarities. The awareness tool implemented in FB induced this behavior without the script that we hypothesized would be necessary based on previous learning science results. Although an attitude change of the awareness conditions only took place for the multiple-perspectives factor, this process resulted in increased declarative knowledge. The correlation between the change on multiple-perspectives and declarative knowledge supports this interpretation. For the control, the seminar topics constituted a rich source of information that could saturate the curiosity inflicted by the socio-cognitive dissonance. This richness, in lack of awareness, might have cancelled out the expected effects of using the fellow students to exchange arguments in a process of knowledge co-construction that was expected to increase declarative knowledge. Another interpretation could be that the high scores in multiple-perspectives and the simultaneous support for this behavior by the seminar content prevented any change for the control; however, this is not supported by the significant lower knowledge outcomes for this condition. For the goal-orientation factor, the control changed their attitude to disfavor this communication strategy, presumably through a superficial impression shared by the seminar at first glance that this strategy is not favored. The lower learning outcomes would explain this impression. In addition, the awareness conditions demonstrated the attitude that the seminar aimed to cultivate; namely, an understanding that some situations require more goal-oriented and structured approaches, although multiple perspectives are in general required.

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