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## The influence of cultural values on U.S. and Danish students' digital behavior: Exploring culture, new media, and social context

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### ABSTRACT

This study explores the intersection of culture, new media, and social context—an essential component of intercultural new media studies—by investigating the social uses of smartphones, tablets, and laptops in university classrooms in Denmark and the US. American and Danish university students differed significantly in (1) frequency of new media use, (2) preferred classroom policies regulating use, (3) perceived impact of use on learning, attention, and student participation, and (4) preferred instructor strategies for handling distracting uses. Danes and Americans also differed significantly in authority values that are linked to students' new media use in the classroom.

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New media; culture; education; Denmark; United States

Although laptops, smartphones, and tablets are ubiquitous in university classrooms across the globe, culture has been underresearched in terms of its impact on how students perceive and use these information and communication technologies (ICTs) in the classroom (Sanchez-Franco, Martinez-Lopez, & Martine-Velicia, 2009). In fact, extant new media research conducted outside the classroom has only scratched the surface investigating the effects of sociocultural factors on social uses of information and communication technologies. For example, early research on culture and new media focused primarily on country differences in computer-mediated communication (CMC; Yoon, 1996), and CMC and the ascendance of electronic global culture (Eszs, 2001; Jones, 2001). More recent intercultural new media scholarship has explored multiple digital platforms including mobile phones (Baron & Segerstad, 2010), text messaging (Ling, 2008; Shuter & Chattopadhyay, 2010), social media (Barker & Ota, 2011; Lin, Peng, Kim, Kim, & LaRose, 2012), blogs (Elola & Oskoz, 2008; Karlsson, 2006), virtual worlds (Diehl & Prins, 2008; Green & Singleton, 2007), and multiplayer online games (Nakamura, 2009; Ward, 2010). Often missing from these and other intercultural new media investigations is the impact of culture on the uses of new media in specific contexts such as classrooms, work, and leisure settings (Shuter, 2014). This study explores the intersection of culture, new media, and social context—an essential component of intercultural new media studies first proposed by Shuter (2011, 2012)—by investigating the social uses of new media in university classrooms in Denmark and the US.

Cross-cultural university classroom research has focused primarily on the influence of student digital multitasking (i.e., ICT use while listening to a lecture) on attention and learning (Viberg & Grönlund, 2013; Vorderer & Hastall, 2009). These studies suggest that culture, especially country of origin, appears to play a role in how students perceive the impact of digital media such as laptops and smartphones on cognitive performance (Sanchez-Franco et al., 2009; Viberg & Grönlund, 2013). Moreover, there is scant cross-national research on how ICTs affect the university classroom in areas beyond attention and learning such as student participation, authority of the professor, and classroom management (Johnson, 2009; Nagy-Shadman & Desrochers, 2008). Finally, although cross-cultural studies have identified country differences in student use of digital media in the university classroom, these investigations have not systemically examined macro-sociocultural factors such as cultural values that may trigger these differences. This study contributes to the cross-cultural literature on uses of digital media in the university classroom by exploring whether Danish and American university students differ in (a) preferred classroom policies to regulate use, (b) perceived impact on learning and student participation, and (c) preferred instructor strategies for handling digital distractions. The investigation also examines the role of cultural values, specifically authority values, on students' digital media use in the university classroom.

## Theoretical and contextual overview

The use of media and technology in the classroom for instructional purposes has a long history beginning in the mid-1900s with the visual instruction movement and evolving over the years to include instructional television, distance learning, computer-mediated instruction, the Internet, and now mobile devices (Reiser, 2001). While there is abundant literature on earlier usage of instructional technology in the classroom (Reiser, 2001), there is a dearth of studies on instructional uses of ICTs, especially mobile devices (Campbell, 2006).

Not surprisingly, student uses of ICTs in university classrooms are widespread especially in technologically developed countries. Vorderer and Hastall (2009) compared U.S., German, and Dutch student perceptions of multitasking in the classroom, including use of digital media such as laptops and phones. They discovered that while students in all three countries commonly multitasked, especially during lectures, they differed in their levels of distraction, irritation, and perceptions of whether multitasking should be permitted. Germans were reported to be the most distracted by multitasking in the classroom followed by the Dutch and lastly Americans. In contrast, Dutch students were the most annoyed by classroom multitasking, followed by Americans and then Germans. When university students were asked whether multitasking, including digital media use, should be permitted during class, 85% of Germans thought it was “normal” and should be permitted, while only 50% of Dutch and American students believed it should be permissible.

While examining mobile phone use in university classrooms in China and the US, Rosenfeld and O'Connor-Petruso (2014) found that Chinese and American students both reported texting during class. However, more Americans than Chinese said that texting in class relieves boredom and, hence, they tended to text significantly more than their Chinese counterparts. Although more Chinese than Americans believed that cell

phones should be shut off during class, a greater percentage of Chinese also reported that they could text in class while working successfully with other students. This study, along with Vorderer and Hastall's European/U.S. investigation (2009), do not attempt to explain the etiology of cultural variations in multitasking and digital media use in the university classroom.

Campbell's (2008) cross-national research in 33 countries on the impact of individualism and collectivism on mobile phone use in classrooms and other settings is among the earliest study to offer a possible explanation for cultural differences in multitasking in classrooms. Campbell's investigation found that individualists tend to be more intolerant of mobile phone use in contexts that require a central focus like classrooms. In contrast, collectivists are more tolerant of technology uses that do not require a communal focus such as sidewalks and stores. Campbell's research suggests that sociocultural factors such as cultural values may play an important role in influencing students' attitudes towards use of mobile phones in the classroom.

Shuter and Chattopadhyay (2014) extended Campbell's line of research by investigating cultural values and mobile phone activity (e.g., texting, calling, and surfing the web) in a variety of settings in Denmark and the United States. While their research did not specifically examine classrooms, they did find that Americans are significantly more reluctant than Danes to engage in phone activity in the presence of authority figures such as teachers or employers. They argued that these findings are consistent with the values of both cultures, with Danes, a nonhierarchical people, less inclined to defer digitally to authority than Americans, who tend to be more hierarchical. Our study continues this line of research by investigating whether authority values influence student uses of digital media in university classrooms in Denmark and the US.

University classrooms in Denmark and the USA are among the most wired in the world (Bryderup & Kowalski, 2002; Vorderer & Hastall, 2009). Both countries widely use ICTs in the classroom and, to varying degree, study their effects on teaching and learning. For years, the Danish government has been requiring schools at all levels to increase their use of ICTs (Bryderup, Larson & Trentel, 2009). Dirckinck-Holmfeld and Lorentsen (2003) argue that university practice in Denmark has been transformed by laptops and other ICTs, fueling the development of what they call "interactive" universities where collaborative, engaged, and virtual learning are encouraged. Lindroth and Bergquist (2010) found that laptops in Danish university classrooms tend to promote what they term "personal learning," especially during lectures, as students complete instructor required online tasks as opposed to simply taking notes. Dalsgaard and Godsk (2007) studied ICTs in graduate education and found that they can be successfully used to create "problem based blended learning" where lecture time is reduced, and student-centered activities are encouraged. Although the research is scarce, these studies and others in Denmark tend to report mainly positive effects of digital media on teaching and learning (Tække & Paulsen, 2012).

While schools and universities in the US have encouraged instructors and students to use digital media in the classroom, studies in this area tend to stress the negative effects of media on student attention and learning (Kraushaar & Novak, 2010; Tremblay, 2010). Wood, Zivcakova, Gentile, Archer, De Pasquale, and Nosko (2012) found that students who multitask in university classrooms with cell phones and laptops tend to be outperformed by students who do not use any digital technologies in class. Duncan, Hoekstra,

and Wilcox (2012) discovered that there was a negative correlation between university in-class use of phone/laptop/tablets and final grades. Testing a large sample of 1839 university students, Junco (2012) also found that learners who multitask with digital media perform less satisfactorily than those who limit their use of digital technology during class.

The divergent research trends in Denmark and the US on the effects of digital media on attention and learning may have some connection to each country's varied cultural values, which are generally defined as preeminent and powerful drivers of human behavior passed down culturally for generations and shared by aggregates of people living in a society. Although there has been criticism of cultural values, they continue to be among the most researched cultural constructs in the social sciences (Kirkman, Lowe & Gibson, 2006). For example, Hofstede's (1980) values framework, critiqued for its dichotomous conceptions of individualism and collectivism, has been expanded by Triandis and Gelfand (1998) who offered a polythetic and multidimensional perspective of cultural values. Turning to their classic studies, Triandis and Gelfand (1998) classify Americans as vertical individualists because they emphasize "... being distinguished and gaining status through competition" (p. 125). A vertical view of self, according to Triandis and Gelfand, places others on a hierarchy which results in less emphasis on equality and more focus on self-differentiation and authority ranking. In contrast, Danes, Swedes, and Norwegians are considered horizontal individualists because they avoid status and "sticking out" and, instead, emphasize conforming, collaborating, and being inconspicuous (Nelson & Shavitt, 2002; Shavitt, Lalwani, Zhang, & Torelli, 2006). Valuing a horizontal view of self, Danes tend to perceive others as equals and diminish power differences and authority distinctions (Shuter & Chattopadhyay, 2014; Triandis, 1995; Triandis & Gelfand, 1998). Moreover, Denmark and the US differ in their value orientations towards power with Danes consistently rated on the Power Distance Index as low power distance—hence, tending to equalize authority relations—while Americans score significantly higher on power distance (Hofstede, 2001; Oyserman, 2006, Shavitt et al., 2006). These differences in cultural values may be reflected in the perceptions and evaluations of digital media in university classrooms, with Danish researchers, for example, emphasizing mobile media's collaborative, empowering potential, and American investigators focusing on their effects on individual student achievement and conformity/obedience to authority.

In light of the preceding literature on cultural values, this study explores the possible influence of authority values on how U.S. and Danish university students use and perceive digital media in class. We believe authority values may have unique heuristic potential for understanding the role of culture on the social uses of digital media in university classes. Hence, we offer the following research questions:

RQ 1: When it comes to utilizing mobile phones, laptops, and tablets in university classes, do Danish and American university students differ significantly in the following: (1) frequency of use, (2) preferred classroom policies to regulate use, (3) perceived impact of use on learning, attention, and student participation, and (4) preferred instructor strategies for handling distracting uses of digital media?

RQ 2: Do Danish and American students differ in authority values regarding professor-student relationships, and does this affect students' use of digital media in classrooms?

## Method

### Data

The study draws upon data from a multiyear, multimethod study among faculty members and students in North America and Europe, funded in part with support from Business Academy Aarhus University of Applied Sciences. This article is based on data collected among students in America from two universities (a public research university in the Southwest, and a private university in the Midwest) and a college in Denmark. Results reported here are based on surveys, administered face to face between October 2013 and February 2014.

### Measures

The survey instrument contained questions on the frequency of students' digital and social media use, preferred classroom policies to regulate use, perceived impact of use on learning, attention, and student participation, preferred instructor strategies for handling distracting uses of digital media, and student perceptions of the power distance (authority values) between themselves and their professors (see Appendix for the list of survey items, adapted from Baker, Lusk, & Neuhauser, 2012; Campbell, 2006; Tindell & Bohlander, 2012). Student digital and social media use were assessed by six questions on the number of hours students use their laptops/tablets and mobile phones on a typical day when school is in session, average number of messages, updates, and voice calls they make or share or receive daily, and the frequency in which they used their mobile computers and cell phones during class to check or send messages. Preferred classroom policies were assessed by students' agreement with various statements concerning the use of electronic devices in class, for example, "University policy should prohibit all use of electronic devices during classes unless such use is specifically required solely by the course instructor," "The policy should be included in the course syllabus," and "There should be no policy." Perceived impact of digital and social media use was assessed by students' agreement on a 7-point Likert scale to a series of statements on the implications of digital media use on student learning, attention, and participation, including "It is distracting when other students check their updates or surf the web during the class," and "Students who use laptops in class tend to hide behind them to avoid class participation." Preferred instructor strategies for handling distracting uses of digital media were assessed by students' agreement (multiple options accepted) with eight statements, ranging from "ignore it" to "discipline and reprimand the student in class," to "impose a grade-based penalty concerning the use of electronic devices in class."

The final part of the survey explored students' perception of authority values, with four statements adapted from the section of Hofstede's (1986) study on cultural differences in teaching and learning, which focused on differences in teacher-student and student-student interaction with respect to power distance (Appendix Q8 Section D). Power Distance is defined as the degree to which less powerful persons in society accept and tolerate inequality of power and consider it normal (Hofstede, 1986). Students' responses were measured on 7-point Likert scales, ranging from strongly disagree to strongly agree.

## Data analysis

For this cross-cultural comparative study, t-tests for equality of means with two tail probabilities calculated were used to explore the differences between the students from America and Denmark. All statistical analyses were performed using SPSS 21 and employed a .05 and .001 level of significance. Bivariate correlations were made between Hofstede's (1986) four authority items for teacher–student interaction (Appendix Q8 Section D) and the following two survey items that reflect classroom policies to regulate use of digital media—(1) the policy should be solely determined by the course instructor, and (2) there should be no policy—and one additional survey item that focuses on preferred instructor strategies when handling distracting cell phone use in the classroom (e.g., impose a grade-based penalty starting with a second offense). These correlations were selected because all three survey items saliently exemplify students' preferred authority role for instructors with respect to (1) classroom policies for digital media use and (2) handling distracting cell phone use in class. All three survey items were significant for Danes and Americans at  $p < .001$ .

## Results

### Characteristics of the sample

Of the total 904 respondents, 49% were male, and 51% were female; 543 were from the United States, and 361 were from Denmark. Respondents ranged in age from 16 to 52 with a median age of 20. With regard to educational year, 38% were freshmen, 28% were sophomore, 21% were juniors, and 13% were seniors. Respondents were from a range of more than 50 academic disciplines including biological sciences, liberal arts, business, communication, computing, design, psychology, and international relations. About 5% of the respondents reported a GPA of less than 2.5, while 31% reported a GPA of 2.5–2.99; 45% of them had a GPA of 3.0–3.49, and 19% reported a GPA of 3.5–4.0. With regard to race/ethnicity, 77% were Caucasian/Non-Hispanic White, 8% were Hispanic, 6% were Asian, and 4% were African American.

Many significant differences were found between Danes and Americans on frequency of digital use, preferred classroom policies to regulate use, perceived impact of use on learning and student participation, and preferred instructor strategies for handling digital distractions. In terms of frequency of use (Table 1), Danes report utilizing their laptops and tablets 5–10 times per week in class ( $M = 5.58$ ,  $SD = 1.12$ ), which is significantly more than Americans ( $M = 3.45$ ,  $SD = 1.71$ ), who indicate in-class use at 1–5 times per month ( $t(901) = -20.90$ ,  $p < .001$ ). In contrast, American university students use their mobile phones in class to check messages 1–4 times per week ( $M = 4.22$ ,  $SD = 1.75$ ), which is significantly more than Danes who report using them 1–5 times per month ( $M = 3.53$ ,  $SD = 1.83$ ),  $t(903) = 5.73$ ,  $p < .001$ . Consistent with these findings, Danes also indicate that they average 5.3 hours per day on their laptops/tablets outside of class when school is in session ( $M = 5.37$ ,  $SD = 2.91$ ), which is significantly more than their American counterparts who average 3.4 hours per day ( $M = 3.99$ ,  $SD = 3.57$ ),  $t(899) = -6.11$ ,  $p < .001$ . Americans, however, use their mobile phones outside class 4.9 hours per day when school is in session ( $M = 4.93$ ,  $SD = 6.10$ ), significantly more than Danes do at 1.7 hours per day ( $M = 1.70$ ,  $SD = 2.48$ ),  $t(897) = 9.56$ ,  $p < .001$ . American



**Table 1.** Means: digital use for Danish and American college students.

	Country		<i>t</i>	<i>df</i>
	Danish	American		
Use laptop/tablet during class	5.58 (1.12) <i>N</i> = 361	3.45 (1.71) <i>N</i> = 542	−20.90***	901
Use cell phone during class to check or send messages	3.53 (1.83) <i>N</i> = 361	4.22 (1.75) <i>N</i> = 544	5.73***	903
Use laptops/tablets on a typical day when school is in session	5.37 (2.91) <i>N</i> = 361	3.99 (3.57) <i>N</i> = 540	−6.11***	899
Use mobile phones outside class on a typical day when school is in session	1.70 (2.48) <i>N</i> = 361	4.93 (6.10) <i>N</i> = 538	9.56***	897
Messages, updates, and voice calls that are made or shared every day	12.10 (15.10) <i>N</i> = 355	88.68 (464.7) <i>N</i> = 536	3.10*	889
Messages, updates, and voice calls that are received every day	15.41 (17.74) <i>N</i> = 354	65.54 (146.66) <i>N</i> = 536	6.40***	888

Note: Standard deviations appear in parentheses below means.

\* $p \leq .05$ .

\*\*\* $p \leq .001$ .

students also report sending ( $M_{\text{Americans}} = 88.68$ ,  $SD_{\text{Americans}} = 464.70$ ;  $M_{\text{Danes}} = 12.10$ ,  $SD_{\text{Danes}} = 15.10$ ) and receiving significantly more text messages  $t(889) = 3.10$ ,  $p = .002$ , and phone calls ( $M_{\text{Americans}} = 65.54$ ,  $SD_{\text{Americans}} = 146.66$ ) each day than do Danes ( $M_{\text{Danes}} = 15.41$ ,  $SD_{\text{Danes}} = 17.74$ ),  $t(888) = 6.40$ ,  $p < .001$ ).

In terms of preferred classroom policies to regulate use of digital media, Danish and U. S. university students differ substantially (Table 2). Significantly more American ( $M = .60$ ,  $SD = .49$ ) than Danes ( $M = .24$ ,  $SD = .42$ ) prefer that digital policies should be developed solely by the instructor and ought to be included in the course syllabus  $t(901) = 11.65$ ,  $p < .001$ . More Americans ( $M = .64$ ,  $SD = .48$ ) than Danes ( $M = .07$ ,  $SD = .26$ ) believe that the digital policies ought to be included in the course syllabus,  $t(902) = 20.78$ ,  $p < .001$ . Interestingly, significantly more Danes ( $M = .37$ ,  $SD = .48$ ) than Americans ( $M = .18$ ,  $SD = .38$ ) thought there should be no policy on the use digital media during class,  $t(902) = -6.58$ ,  $p < .001$ .

**Table 2.** Means: preferred classroom policies to regulate use of digital media for Danish and American college students.

	Country		<i>t</i>	<i>df</i>
	Danish	American		
The policy should be solely determined by the course instructor.	.24 (.42) <i>N</i> = 361	.60 (.49) <i>N</i> = 542	−22.65***	901
There should be no policy.	.37 (.48) <i>N</i> = 361	.18 (.38) <i>N</i> = 543	−6.58***	902
Instructors tend to be clueless about how much phone messaging is going on in class.	5.37 (2.91) <i>N</i> = 361	3.99 (3.57) <i>N</i> = 544	−6.11***	899

Note: Standard deviations appear in parentheses below means.

\* $p \leq .05$ .

\*\*\* $p \leq .001$ .



Danish and American students also differed in preferred instructor strategies when handling distracting cell phone use in class (Table 3). Although Danes and Americans agreed that instructors should make a joke or refer in a “light-hearted way” when a cell phone rings in class, they differed in other instructor strategies. Americans, for example, preferred significantly more than Danes that instructors take an active role by (1) imposing a grade-based penalty beginning with a second offense ( $M_{\text{Danes}} = .02$ ,  $SD_{\text{Danes}} = .14$ ;  $M_{\text{Americans}} = .08$ ,  $SD_{\text{Americans}} = .27$ ),  $t(900) = 3.89$ ,  $p < .001$  and (2) speaking with the student in private after class ( $M_{\text{Danes}} = .21$ ,  $SD_{\text{Danes}} = .41$ ;  $M_{\text{Americans}} = .33$ ,  $SD_{\text{Americans}} = .47$ ),  $t(900) = 3.91$ ,  $p < .001$ . In contrast, Danes were significantly more ( $M = .21$ ,  $SD = .41$ ) inclined than Americans ( $M = .12$ ,  $SD = .33$ ) to prefer that an instructor discuss a phone distraction with the student during class,  $t(900) = -3.69$ ,  $p < .001$ . Although Danes ( $M = .40$ ,  $SD = .49$ ) and Americans ( $M = .52$ ,  $SD = .50$ ) tend to prefer that instructors ignore an in-class ringing mobile phone, Americans were significantly more inclined to prefer this instructor strategy,  $t(900) = 3.63$ ,  $p < .001$ .

In terms of perceived impact of digital media on learning, attention, and class participation, Danish and American students had similarities and differences (Table 4). While Americans and Danes did not report being distracted when peers surfed the web in class, they did differ significantly in their perceptions of mobile phone use during class. Americans tend to view classroom use of mobile phones significantly more positively than Danes; for example, significantly more Americans ( $M = 5.27$ ,  $SD = 1.42$ ) than Danes ( $M = 4.80$ ,  $SD = 1.62$ ) agree that mobile phone use can assist in the learning process,  $t(902) = 4.62$ ,  $p < .001$ . Similarly, more Americans ( $M = 3.75$ ,  $SD = 1.66$ ) tend to disagree that any mobile phone use in class disrupts the learning process than Danes ( $M = 4.32$ ,  $SD = 1.82$ ),  $t(903) = -4.94$ ,  $p < .001$ . And while many Americans and Danes tend to agree somewhat that it is disruptive when a phone rings during class, more Danes ( $M = 5.60$ ,  $SD = 1.48$ ) agree with this statement than Americans ( $M = 5.13$ ,  $SD = 1.46$ ),  $t(903) = -4.72$ ,  $p < .001$ . Finally, more American students ( $M = 5.51$ ,  $SD = 1.36$ ) than Danish students ( $M = 3.88$ ,  $SD = 1.71$ ) agree that mobile phones are critical for safety and should be left on at all times in case of a campus emergency,  $t(901) = 15.92$ ,  $p < .001$ .

**Table 3.** Means: preferred instructor strategies when handling distracting cell phone use in class for Danish and American college students.

	Country		<i>t</i>	<i>df</i>
	Danish	American		
Impose a grade-based penalty starting with the second offense	.02 (.14) <i>N</i> = 361	.08 (.27) <i>N</i> = 541	3.89***	900
Speak with the student in private after class	.21 (.41) <i>N</i> = 361	.33 (.47) <i>N</i> = 541	3.91***	900
Discuss the interruption with the student right then	.21 (.41) <i>N</i> = 361	.12 (.33) <i>N</i> = 541	-3.69***	900
Ignore an in class ringing mobile phone	.40 (.49) <i>N</i> = 361	.52 (.50) <i>N</i> = 541	3.63***	900

Note: Standard deviations appear in parentheses below means.

\* $p \leq .05$ .

\*\*\* $p \leq .001$ .

**Table 4.** Means: perceived impact of digital media on learning, attention, and class participation for Danish and American college students.

	Country		<i>t</i>	<i>df</i>
	Danish	American		
Certain types of cell phone use in class can assist in the learning process.	4.80 (1.62) <i>N</i> = 361	5.27 (1.42) <i>N</i> = 543	4.62***	902
Any use of cell phones in class is generally disruptive to the learning process.	4.32 (1.82) <i>N</i> = 361	3.75 (1.66) <i>N</i> = 544	-4.94***	903
It is disruptive when another student's cell phone goes off (rings/makes noises) in class.	5.60 (1.48) <i>N</i> = 361	5.13 (1.46) <i>N</i> = 544	-4.72***	903
As part of the campus emergency alert system, cell phones are critical to my safety and should be left on at all times.	3.88 (1.71) <i>N</i> = 361	5.51 (1.36) <i>N</i> = 542	15.92***	901
It is distracting when other students check their updates or surf the web during the class.	3.80 (1.92) <i>N</i> = 361	3.73 (1.77) <i>N</i> = 544	-.583	903
Students who use their cell phones or laptops in class tend to focus on their online activity rather than topic related to the class.	4.65 (1.51) <i>N</i> = 361	4.79 (1.45) <i>N</i> = 533	1.40	903
Students who use laptops in class tend to be reluctant to answer instructor questions posed to the class.	3.82 (1.55) <i>N</i> = 361	3.72 (1.49) <i>N</i> = 544	-1.05	903
Students who use laptops in class tend to hide behind them to avoid class participation.	3.96 (1.60) <i>N</i> = 361	4.00 (1.50) <i>N</i> = 541	.432	900
Students who use their phones in class tend to interact less in class discussion.	4.64 (1.49) <i>N</i> = 361	4.60 (1.42) <i>N</i> = 542	-.475	901
Instructors tend to avoid asking questions to students who use laptops and phones in class.	3.00 (1.47) <i>N</i> = 361	3.02 (1.34) <i>N</i> = 544	.242	903

Note: Standard deviations appear in parentheses below means.

\* $p \leq .05$ .

\*\*\* $p \leq .001$ .

Turning to authority values regarding professor-student relationships, Danes and Americans differ significantly, with Danes possessing a more equalitarian authority value than Americans, whose views tend to be significantly more hierarchical (Table 5). For example, significantly more Americans ( $M = 3.09$ ,  $SD = 1.52$ ) than Danes ( $M = 4.02$ ,  $SD = 1.78$ ) tend to disagree that professors and students have equal status in the classroom,  $t(901) = -8.40$ ,  $p < .001$ . Significantly more Danes ( $M = 5.46$ ,  $SD = 1.33$ ) than Americans ( $M = 4.58$ ,  $SD = 1.54$ ) agree that students having the right to express disagreement with their professors in public,  $t(901) = -8.81$ ,  $p < .001$ . Similarly, more Danes ( $M = 5.19$ ,  $SD = 1.29$ ) than Americans ( $M = 4.97$ ,  $SD = 1.40$ ) agree with the statement that professors should consult with students before making decisions that affect them,  $t(901) = -2.39$ ,  $p = .02$ . Finally, American responses ( $M = 5.33$ ,  $SD = 1.20$ ) are significantly more in agreement than Danes ( $M = 5.16$ ,  $SD = 1.18$ ) that professors have the right to decide standards of performance expected from students,  $t(898) = 2.04$ ,  $p = .04$ .

Results show that in multiple aspects, authority values significantly correlate with preferred classroom policies to regulate classroom digital devices as well as with instructor strategies when handling distracting cell phone usage (Table 6). All positive and negative correlations between survey items associated with authority values and classroom policies/

**Table 5.** Means: beliefs about professor–student relationships for Danish and American college students.

	Country		<i>t</i>	<i>df</i>
	Danish	American		
Professor and students have equal status in the classroom.	4.02 (1.78) <i>N</i> = 361	3.09 (1.52) <i>N</i> = 542	−8.40***	901
Students have the right to express disagreement with their professors in public.	5.46 (1.33) <i>N</i> = 361	4.58 (1.54) <i>N</i> = 542	−8.81***	901
Professors should consult with students before making decisions that affect them.	5.19 (1.29) <i>N</i> = 361	4.97 (1.40) <i>N</i> = 542	−2.39*	901
Professors have the right to decide standards of performance expected from students.	5.16 (1.18) <i>N</i> = 361	5.33 (1.20) <i>N</i> = 539	2.04*	898

Note: Standard deviations appear in parentheses below means.

\* $p \leq .05$ .

\*\*\* $p \leq .001$ .

**Table 6.** Bivariate correlations between four items associated with authority values and three survey items for preferred classroom policies and handing distracting cell phone use ( $N = 904$ ).

	Professor and students have equal status in the classroom	Students have the right to express disagreement with their professors in public.	Professors should consult with students before making decisions that affect them.	Professors have the right to decide standards of performance expected from students.
The policy should be solely determined by the course instructor.	−.22**	−.06	−.09*	.13**
There should be no policy.	.13**	.01	.04	−.14**
Impose a grade-based penalty starting with the second offense.	−.11**	−.07*	−.10**	.08*

\* $p \leq .05$ .

\*\* $p \leq .01$ .

instructor strategies are consistent with other results of the study. For example, “(a) professor and students have equal status in the classroom,” “(b)” students have the right to express disagreement with professor in public,” and (c) “professors should consult with students before making decision that affect them”—three major items for authority values—are negatively correlated with (1) “the (digital) policy should be solely determined by the course instructor” (a.  $r[903] = -.22, p < .01$ ; b.  $r[903] = -.06$ ; c.  $r[895] = -.09, p < .05$ ) and (2) “impose a grade-based penalty starting with the second offense” (a.  $r[901] = -.11, p < .01$ ; b.  $r[901] = -.07, p < .05$ ; c.  $r[895] = -.10, p < .01$ ). These correlations are consistent with the study’s results that since Americans are significantly more hierarchical than Danes they prefer that the course instructor determines digital policy and prefer penalties for second offense; hence, resulting in a negative relationship between these authority value and digital items. Moreover, these three authority items are positively correlated with the item “there should be no policy,” (a.  $r[902] = .13, p < .01$ ; b.  $r[902] = .01$ ; c.  $r$

[896] = .04), which is also consistent with the study's results that more equalitarian Danes are significantly more inclined than Americans to prefer no digital policy in class; hence, a positive relationship between these items.

Finally, "professors have the right to decide standards of performance expected from students,"—the fourth authority value item—is positively correlated with (1) "the policy should be solely determined by the course instructor" ( $r[897] = .13, p < .01$ ) and (2) "impose a grade-based penalty starting with the second offense" ( $r[897] = .08, p < .05$ ; Table 6). These correlations are consistent with the study's results that Americans, who are significantly more hierarchical than Danes, prefer that instructors determine digital policy and impose a grade penalty, which accounts for the significant positive relationship between these items. This fourth authority value item is also negatively correlated with "there should be no policy" ( $r[898] = -.14, p < .01$ ). This finding is also compatible with the study's results that more equalitarian Danes prefer no class policy, while more hierarchical Americans are less supportive of this, accounting for the significant inverse relationship between these items.

## Discussion

The results suggest that Danish and U.S. university students differ significantly when utilizing digital media in the classroom in the following areas: (1) frequency of use, (2) preferred classroom policies to regulate use, (3) perceived impact of use on learning, attention, and student participation, (4) and preferred strategies for handling distracting uses of digital media. Interestingly, Danes use their laptops and tablets in class significantly more than do Americans, while Americans use their mobile phones significantly more than Danes. This pattern is also reflected in Danish and U.S. laptop and mobile phone use outside of class, with Danes significantly more apt to be on their laptops/tablets while Americans are clearly more active users of their mobile phones, also sending and receiving significantly more text messages. Student preferences for laptops/tablets in Denmark and mobile phones in the US are consistent with current economic trends that, because of reduced cost of U.S. cell phone service and equipment, smartphones have grown exponentially in the US, eclipsing laptops and tablets (Shuter & Chattopadhyay, 2014). However, these results also suggest that Americans may be significantly more distracted in class by their cell phones, since they report checking their messages 1–4 times per week, while Danes review them 1–5 times per month.

Interestingly, U.S. preference for in-class use of cell phones may be fueled by students' view that they can be used to aid learning which is not consistent with the Danish perspective. Similarly, Americans also view cell phones as critical for safety and believe they should be left on at all times on campus, which is contrary to what Danes believe. For Americans, then, cell phones appear to have positive instrumental uses during class, which appear to be linked to their increased classroom use.

When it comes to regulating in-class use of digital media, Danes and Americans reveal markedly different preferences. Americans prefer significantly more than Danes that instructors should solely develop digital class policies and include them in class syllabi. Curiously, significantly more Danes than American believe there should be no policy for in-class use of digital media. These findings appear to be consistent with cultural values regarding authority in Denmark and the US.

It appears from these findings that cultural values regarding authority may be influencing preferred policies and social uses of digital media in the classroom. The correlations reported in the study support this connection, since they are consistent with the study's results regarding Danish and American authority values and preferred digital policies and behavior in the classroom. That is, when equalitarianism is valued more, as it is with Danes in this study, it correlates negatively with digital policy being determined solely by the course instructor and imposing a grade-based penalty starting with the second violation (offense) of class policy. Conversely, when hierarchy is preferred, as it is with Americans, it correlates positively with the policy being solely determined by the course instructor and imposing a grade-based penalty starting with the second offense. While the 12 correlations vary in strength, they are all in line with the results of the study and significant in nine of 12 instances which suggest—along with the study's results supporting extant literature on Danish/U.S. authority value differences—that authority values may be influencing students' digital preferences and behavior in the classroom.

Given extensive past social psychological research that cultural values are foundational to communicative behavior (Hofstede, 1980; Kluckhohn & Strodtbeck, 1961; Triandis, 1995), it may not be surprising that they also may affect aspects of digital behavior. While past research on public uses of mobile communication has uncovered interesting differences across cultures (Baron & Campbell, 2010, 2012; Shuter, 2011, 2012; Shuter & Chattopadhyay, 2014), university classroom research on cultural values and digital behavior is virtually absent from the literature. This study behooves investigators to further explore how digital behavior may be linked to cultural values especially in areas such as (a) digital policies in the university classroom, (b) preferred instructor strategies for managing digital behavior, and (c) frequency and type of digital technology students use in the classroom.

It is also clear from the nonsignificant results that Danish and American students share some similarities in how they view digital media in the classroom (Table 4). Interestingly, they both report not being distracted by students' in-class use of cell phones or laptops, nor do they view them as inhibiting class participation. For example, they both somewhat disagree that it is distracting when other students check their updates or surf the web during class. Similarly, they are neutral when it comes to students using their laptops, tablets, or cell phones in class to focus on online activity rather than class topics. Both somewhat disagree that students who use laptops or tablets are reluctant to answer instructor questions. Nor do they support the view that students who use laptops or tablets hide behind them to avoid class participation or that these students interact less in class discussion. And they somewhat disagree that instructors avoid asking questions to students who use laptops, tablets, or cell phones in class. These results suggest that university students in these two countries are not especially concerned that laptops, tablets, or cell phones are detrimental to learning, attention, or class participation, which may conflict with instructors who have a more negative view of using digital media in the classroom.

Future investigations should extend our line of research by exploring in-class use of digital media in additional countries that appear to have divergent authority values. It is important to assess correlations between authority values and classroom digital policies/behavior to determine the presence and significance of the relationships between

these variables in different contexts. These data will help determine to what extent authority values influence specific dimensions of digital media use in the university classroom. Furthermore, cross-cultural investigations should gather survey data from university instructors and students to determine if these two groups differ, either within and/or across cultures, in terms of (a) cultural values regarding authority, (b) digital policies in the university classroom, (c) preferred instructor strategies for managing digital behavior, and (d) frequency and type of preferred digital technology use in the classroom. With these data, researchers can more accurately identify, both within and across cultures, areas of potential conflict in student and instructor values regarding authority as well as their respective preferences for managing and using digital media in the classroom.

This study suggests that while culture, particularly authority values, seems to play a significant role in students' digital behavior in the classroom, there may be transcultural factors at play that may universalize certain behavioral dimensions of technology. That is, similarities of Danish and U.S. students identified in the nonsignificant results may be an outcome of the cultures' shared values of individualism and/or an indication of more universal normative patterns guiding students' digital communication. To explore the etiology of digital normative patterns and their possible universality, future cross-national research is needed on digital behavior in the classroom in both individualistic and collective societies. With these types of comparative intercultural studies, researchers will have a richer understanding of the sociocultural and universal factors that influence student and instructor digital communication.

It would be valuable in future studies to use mixed methods to gather both self-report survey data and real-time observational information. Surveys can be accompanied by structured classroom observations that examine students' real time use of digital devices along with their actual participation in class with instructors and peers. Combining survey and observational methods, rarely used in classroom technology research, should strengthen and enrich future findings.

Finally, this study advances our understanding of intercultural new media studies (INMS), uncovering additional connections between culture, new media, and social context. Continued refinement of INMS requires research on multiple dimensions of culture in a variety of social contexts to determine in what ways they may impact social uses of new media. For example, in addition to authority values, future digital studies should explore the link between new media and cultural values associated with gender, uncertainty avoidance, and pragmatism and individualism (Hofstede, 1986). Other classic dimensions of culture such as Hall's high/low context communication, Triandis' (1995) universalism/particularism, and Trompenaars and Hampden-Turner's (2004) affectivity/neutrality are worthwhile areas of exploration in terms of their possible influence on social uses of new media. Conducting future intercultural new media investigations in a range of public, work, and leisure settings are also important to further map the linkage between culture, new media, and social context.

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## Appendix: Survey

(A) Direction: Read the questions and *FILL IN* or *CHECK* your answers

Q1 How many hours do you use your laptops/tablets on a typical day when school is in session? \_\_\_\_\_

Q2 How many hours do you use your mobile phones on a typical day when school is in session? \_\_\_\_\_

Q3 On average, how many messages, updates, and voice calls do you *make or share* every day? \_\_\_\_\_

Q4 On average, how many messages, updates, and voice calls do you *receive* every day? \_\_\_\_\_

Q5 How often do you use your computer/laptop/tablet during class?

- ☐ Used in almost every class
- ☐ Used in class 5–10 times per week
- ☐ Used in class 1–4 times per week
- ☐ Used in class 1–5 times per month
- ☐ Rarely used in class
- ☐ Never used in class

Q6 How often do you use your cell phone during class to check or send messages?

- ☐ Used in almost every class
- ☐ Used in class 5–10 times per week
- ☐ Used in class 1–4 times per week
- ☐ Used in class 1–5 times per month
- ☐ Rarely used in class
- ☐ Never used in class



