

An examination of the relationship between Facebook groups attached to university courses and student engagement.

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Abstract

Educators and researchers are increasingly interested in the benefits of using Facebook groups attached to university, largely around connectedness, engagement, and sense of belonging. However, thus far there have been no broad-scale investigations on the potential outcomes of course-attached Facebook groups. The current study used both within-and between-group analyses on 471 participants, in order to investigate whether courses with an attached official or unofficial Facebook group was related to increased student engagement (in the categories of relationships with faculty members, peer relationships, behavioural-engagement, cognitive-engagement, valuing, and a sense of belonging) and degree-identity compared to courses without Facebook groups. Results indicated that students reported interacting more with unofficial than official Facebook groups. Courses with an official Facebook group had significantly greater staff-connectedness compared to courses without an official Facebook group, while courses with either an official or unofficial Facebook group had a significantly higher peer relationships compared to courses without any Facebook group. Students with either an official or unofficial Facebook group had a significantly higher sense of belonging. Though students with either an official or unofficial Facebook group reported higher degree-identity, this may be primarily due to the unofficial, rather than official Facebook groups, this difference may only exist in the unofficial, but not the official Facebook groups.

KEYWORDS: Facebook, engagement, connectedness, identity, belonging

1. Introduction

There is increasing interest by both educators and researchers in the use of social media sites as an educational tool in a tertiary academic setting (Aydin, 2012; Manca and Ranieri, 2016; Piotrowski, 2015; Tess, 2013). Facebook, being the most popular social media site (Duggan, Ellison, Lampe, Lenhard, and Madden, 2015) has received the most interest (Aydin, 2012; Tess, 2013). Authors have suggested that Facebook's popularity amongst students, and the students' existing expertise with the platform, may mean that Facebook can be more easily or effectively used as an educational tool (e.g., Barczyk, 2013; Clements, 2015; Hurt et al., 2012). Roblyer, McDaniel, Webb, Herman, and Witty (2010) note three broad categories of how social networking sites like Facebook may be used in the tertiary education sector: a library social media presence, administrative uses (e.g., a university, program, or discipline wide page informing students of events), and use with teaching specific courses/subjects. For the purposes of this research, we limit our discussion to the later: when a Facebook page or group (henceforth referred to as group) is attached to a specific course.

Proponents of the use of social media in education suggest that because it facilitates two way student-student, and staff-student communication (Barczyk, 2013), one of the key benefits of Facebook (Hurt et al., 2012) may be that it increases the classroom community/sense of belonging (e.g., Barczyk, 2013; Hung and Yuen, 2010; Hurt et al., 2012; Kabilan, Ahmad, and Abidin, 2010; McCarthy, 2010) and student engagement, particularly student-staff and student-student relationships (e.g., Barczyk, 2013; Clements, 2015; Hurt et al., 2012; Ivala and Gachago, 2012; Lam, 2012; McCarthy, 2010). If Facebook is effective at increasing sense of belonging and engagement, this would be an important finding, as student sense of belonging and student engagement have themselves been linked to improvement on a number of important student outcomes, such as academic grades, academic motivation,

self-esteem, intention to persist, and student satisfaction (Freeman, Anderman, and Jensen, 2007; Hausmann, Schofield, and Woods, 2007; Kahu, 2013; Trowler and Trowler, 2010). However, much of the existing research on Facebook and student engagement and sense of belonging has focused on student and staff perceptions, with comparatively less research investigating belonging and engagement outcomes when Facebook is attached to specific university courses.

1.1. Student and Staff Perceptions

There is conflicting evidence on students' opinions of Facebook as an educational tool. For instance, Roblyer et al. (2010) found that only 26.6% of students suggested that they would "welcome the opportunity to connect with faculty/students on Facebook", which the authors suggested indicated a lack of student support for uptake of Facebook use. In contrast, Irwin, Ball, Desbrow, and Leveritt (2012) found that students anticipated that Facebook would increase student-student and student-staff interaction (80.8%) and increase general discussion on course topics (80.0%). However, these statistics report student *anticipatory* opinions. For instance, similar to Roblyer et al. (2010), Hurt et al. (2012) found little initial student support for online formal or informal discussions, though there was a significant increase after students' actually experienced the implementation of a course-attached Facebook group (i.e. set up and moderated by teaching staff). Similarly, DiVall and Kirwin (2012) found little initial student support for the inclusion of a course Facebook group, however a post-course evaluation revealed that 86% of students found the course Facebook group beneficial.

This is consistent with other post-course evaluations on courses with an attached Facebook group, which suggest that students find course Facebook groups beneficial and that they enable class discussion, encourage communication and relationship with peers, assist with sharing educational resources and knowledge, and encourage learner-centred and

collaborated learning (Hung and Yuen, 2010; McCarthy, 2010). As such, in summary, it appears that students perceive Facebook as having benefits around enabling communication and developing peer and staff relationships.

However, while informative, these student-perception studies tell us little about whether the use of a course Facebook page measurably increases outcomes, such as the students' sense of belonging and engagement in a course. The lack of evaluation of outcomes associated with the use of Facebook as an educational tool appears to be one of the concerns of faculty, and may be a barrier to uptake. Celik, Akilli, and Onuk (2014) found that although faculty agreed that the use of social media could improve efficiency (77.77%), increase student participation (75.56%), and believe social media in education would be useful (85.18%), 77.03% stated that they were concerned about the measurement and *evaluation* of the effects of implementing social media in education. This is broadly consistent with Brooks (2015), who found that the biggest motivator of faculty uptake of technology in education was evidence of student benefit.

1.2. Empirical Research

Despite the importance of evaluation, there is little rigorous investigation of the actual effects of attaching a Facebook page or group to a university course. As an example of an impressively designed intervention study, Dyson, Vickers, Turtle, Cowan, and Tassone (2015) split five offerings of a course into three segments. For each offering, the researchers implemented a discussion on Facebook of the course content for each week in only one of the segments. The authors then measured cognitive engagement by a single item ("How much did this third of the course engage you?") for each of the course segments. Dyson et al. (2015) found a significant main effect of time, such that cognitive engagement increased as the semester progressed, but not a significant effect of the Facebook intervention. However, the authors note the low frequency of students who looked at the Facebook discussion during

intervention segments. When the results are analysed with respect to students who looked at the Facebook discussion, the results revealed that students who did look at the discussion, *did* exhibit increased cognitive engagement.

Other research has compared Facebook with other online tools, such as Blackboard. For instance, Hurt et al. (2012) conducted a post-course evaluation of two different offerings of two different courses (i.e., four groups in total). In one offering in each course there was Facebook discussions, and in the other offering there was Blackboard e-Learning Commons discussions. The implementation of the staff initiated discussions was the same in both the Facebook offering and the Blackboard offering, with the exception that there was additional in-class training on Facebook's privacy settings for the Facebook offering. The results revealed that in both courses, the Facebook offerings had significantly higher student ratings on comfort with formal and informal online discussions compared to before the course, and compared to the Blackboard offering. Furthermore, the Facebook offering had significantly higher ratings than the e Blackboard offerings on students' feeling like a valued participant, and getting to know other students. In addition, in one course, the Facebook offering had significantly higher ratings in the item "shaping the way you think" (i.e., cognitive engagement)

However, while providing evidence for the efficacy of Facebook in increasing student engagement in controlled studies, studies such as Hurt et al. (2012) and Dyson et al. (2015) are limited by their restriction of analysis to one or two courses. In this way, they are essentially controlled experimental or quasi-experimental case studies, which may suffer from a lack of external validity. The specific implementation and teaching activities on Facebook by the staff in these studies may not represent the implementation of Facebook by staff more broadly, and as such, the results of these studies may not apply outside of the specific procedures and context in those studies. In contrast, other research, such as Junco

(2012), attempts to expand research beyond specific courses, and investigate broader trends linking Facebook with student engagement. However, Junco (2012) investigated students' use of Facebook *generally*, as opposed to course-specific Facebook groups. To the authors' knowledge, there has been no studies investigating whether course-attached Facebook groups impact student engagement, outside of specific experimental or quasi-experimental case studies.

1.3. This Study

The primary purpose of this study was to investigate whether a course-attached Facebook group was related to increased student engagement. For the purposes of this research, we used Gunuc and Kuzu's (2014) conception of student engagement. Gunuc and Kuzu (2014) conceptualise student engagement along two dimensions, campus-engagement (comprising valuing and sense of belonging), and class-engagement (comprising cognitive engagement, peer relationships, relationships with staff, and behavioural engagement).

As one of the benefits of an official course Facebook group is increased opportunities for interaction with staff (e.g., DiVall and Kirwin, 2012), we predicted that classes with official course Facebook groups (i.e., set up and monitored by course staff, with active staff involvement) would have increased student relationships with staff compared to classes with unofficial Facebook groups (i.e., set up by students, with no staff involvement) or no Facebook group. Further, as class-specific Facebook groups (unofficial or official) in general are likely to facilitate peer-interaction (e.g., Barczyk, 2013), we predicted that classes with Facebook groups (unofficial or official) would have increased student peer relationships compared to classes without a Facebook group.

Although sense of belonging is categorised as *campus*-engagement in Gunuc and Kuzu's (2014) model (and therefore is not related to a specific course, e.g. item "I feel myself as a part of the campus"), a sense of community/belonging is believed to be one of the

outcomes of Facebook groups (e.g., Barczyk, 2013; Hung and Yuen, 2010; Hurt et al., 2012; Kabilan et al., 2010; McCarthy, 2010), and is related to affective engagement (peer and staff relationships) in Gunuc and Kuzu's (2014) model. As such, we predicted that students with either an official or unofficial course Facebook group would have increased sense of belonging compared to students with no Facebook group.

We also investigated students' identification with their degree. Research has indicated that Facebook is important for college students developing their sense of identity (Pempek, Yermolayeva, and Calvert, 2009). As identity is influenced by students' relationships and communications with their peers (Pempek et al., 2009) and is logically related to belonging, we expected a stronger discipline specific student identity for students who had an official or unofficial Facebook group, compared to those with no Facebook group.

The results of studies investigating whether Facebook is effective for learning and cognitive-engagement (i.e., motivation, effort, and valuing learning) are more mixed (e.g., Hurt et al., 2012), and it seems likely that this will be highly dependent upon faculty use of specific teaching methods implemented in Facebook (Hurt et al., 2012; Irwin et al., 2012; Kabilan et al., 2010). As we did not control or measure specific teaching approaches or interventions, and surveyed a wide variety of courses, we expected a large degree of variance in the usage of Facebook by staff, and therefore a wide variation in the effectiveness of Facebook for increasing cognitive-engagement. As such, though we compared cognitive-engagement in courses with attached official Facebook versus courses with none or an unofficial Facebook, we made no specific predictions. We found no reason or previous research to suggest any differences on behavioural-engagement (i.e., following rules and norms in class) for courses with Facebook versus courses without, so though these variables were included for the sake of completeness, no predictions were made.

A secondary purpose of this study was to investigate differences in use and student opinions of official compared to unofficial course Facebook groups. To the authors' knowledge, there have been no studies investigating differences between official- and unofficial- course Facebook groups. We expected that students would report that official, compared to unofficial, Facebook groups were useful at increasing interaction with staff. No other specific predictions were made

2. Method

2.1. Participants

Participants were recruited from a large (approximately 46,000 students) Australian university via two means. First, students voluntarily participated in exchange for partial course credit in an introductory psychology course. Second, the study was included in a university wide monthly email sent to all students asking for volunteers for research projects. All participants had the opportunity to gain an automated personality profile and enter the draw for a \$100 gift voucher in return for participation. Recruitment was open towards the end of two semesters (week 8 onwards). In total there were 471 participants, 361 females, 105 males, and five who indicated other. Age ranged from 17 to 59 years ($M = 22.20$, $SD = 6.68$ years). Participants were enrolled in 91 different degrees or degree combinations (i.e., dual degrees, degree major if specified).

2.2. Materials

2.2.1. Student engagement. To measure student engagement we used Gunuc and Kuzu's (2014) student engagement scale, which has been used to investigate the role of classroom technology on student engagement (Gunuc and Kuzu, 2015). This scale measures six types of engagement, under the broad categories of campus- and class-engagement. The four class-engagement scales (cognitive engagement, peer relationships, relationships with faculty members, behavioural engagement) were presented with a frame-of-reference so they

referred to specific courses (e.g., “I feel myself as a part/member of a student group for [COURSECODE]”, see design section for further details). The cognitive engagement scale had 10 items (e.g., “I motivate myself to learn for [COURSECODE]”), and had good internal consistency ($\alpha=.89$ for the official-Facebook-course; $\alpha=.86$ for the no-official-Facebook-course (see design section for further details). The peer relationships scale had six items (e.g., “I feel myself as a part/member of a student group for [COURSECODE]”), had good internal consistency ($\alpha=.87$ for both official- and no-official-Facebook-course). The relationship with faculty members scale had 10 items (e.g., “My teachers in [COURSECODE] show regard to my interests and needs”), and had good internal consistency ($\alpha=.89$ for the official-Facebook-course; $\alpha=.92$ for the no-official-Facebook-course). The behavioural engagement scale had four items (e.g., “I follow the rules in class for [COURSECODE]”), and had acceptable internal consistency ($\alpha=.75$ for the official-Facebook-course; $\alpha=.66$ for the no-official-Facebook-course). The two campus-engagement scales (valuing and sense of belonging) were only presented once per participant, and had no frame-of-reference. The valuing subscale had three items (e.g., “I believe university is beneficial for me”), and demonstrated good internal consistency ($\alpha=.79$). The sense of belonging subscale (e.g., “I feel myself as a part of the campus”) has eight items, and demonstrated good internal consistency ($\alpha=.88$). All engagement scales were measured on a 5-point scale ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*, and items were averaged to form scales.

2.2.2. Student identity. Student identity was measured by four items (e.g., “I see myself as a [PROGRAMNAME] student”) used in Doosje, Ellemers, and Spears (1995). The items were adapted to insert [PROGRAM NAME] for the students’ relevant program, rather than “psychology” as in the original. Items were measured on a 5-point scale ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. The scale had an internal consistency of .76.

2.2.3. Facebook activities. In order to obtain an indication of students' interaction with the Facebook groups, we compiled a list of what we expected to be common Facebook activities (e.g., "Replied to a post or comment"), and asked participants with an official or unofficial Facebook page how often they engaged in these behaviours. These items were rated on a 6-point scale, ranging from 1 = *Never* to 6 = *Multiple times a day*, and were analysed individually (see Table 4 for list of items).

2.2.4. Student opinion. As most previous research on university courses with an attached Facebook group used opinion or perception data, we included a measure of student opinion in order to make comparisons. To measure student opinion on course Facebook use, we adapted items used by Irwin et al. (2012). Irwin et al. (2012) included communication with peers and course convenor as a single item, which we separated. The seven items (see Table 5 for item list) were rated on a 5-point scale, ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*, and were analysed individually.

2.3. Procedure and Design

The on line survey was hosted on Qualtrics. University ethics approval was granted and all participants provided their informed consent..

At the beginning of the survey, participants were instructed to enter their degree title (e.g., "Bachelor of Psychology"). This information was imputed into the student identity scale items (see Materials section). Participants were also asked how many courses they had completed/were completing that semester (see Figure 1, Step 1). For each course, they were asked to enter the course code (see Figure 1, Step 2), and indicate whether the course had an official Facebook group, and/or an unofficial Facebook group (see Figure 1, Step 3). In order to reduce participant burden, instead of answering questions for each course, the survey selected a maximum of two courses (one with an official Facebook group and one without an official Facebook group) for students to answer questions about. The survey randomly

picked one course with an official Facebook group attached (if available; henceforth referred to as official-Facebook-course, e.g., Figure 1 [COURSECODE2]), and one course without an official Facebook attached (if available; henceforth referred to as no-official-Facebook-course, e.g., Figure 1 [COURSECODE3]). As such, both the official-Facebook-course and the no-official-Facebook-course may or may not have had an unofficial Facebook course attached (see Figure 1).

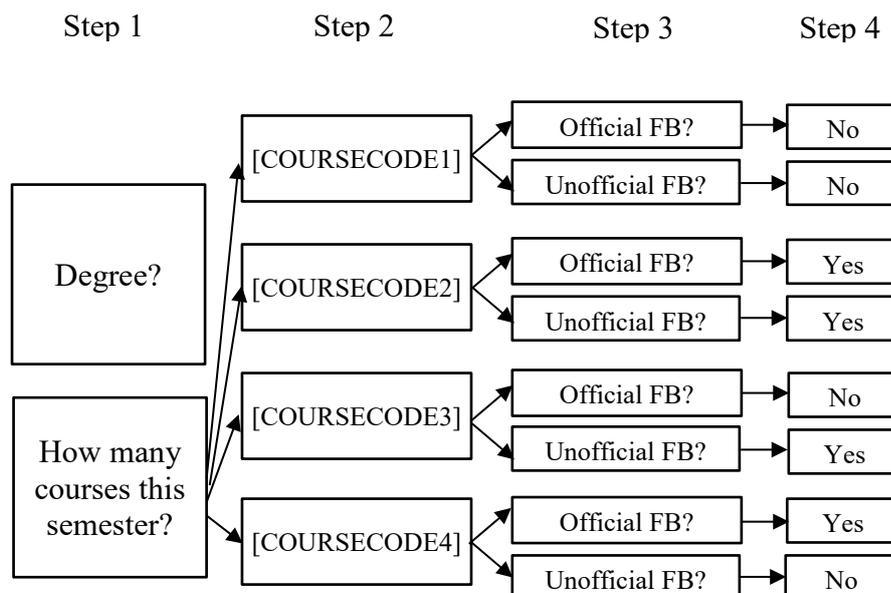


Figure 1. Depiction of the initial survey stages where courses were selected. FB = Facebook.

Course codes were imputed into the student engagement scale items (Gunuc and Kuzu, 2014) for each of the two courses. Participants then answered questions on their Facebook use and opinions about Facebook use in the course with an official Facebook group. If the no-official-Facebook-course had an unofficial Facebook group, these questions were also asked about the unofficial Facebook group. The official-Facebook-course and the no-official-Facebook-course question blocks were randomised. After the course specific questions, general questions were presented, including demographics, the campus-engagement scales from Gunuc and Kuzu's (2014) engagement scales, and the degree identity scale.

As such, the survey design allowed for both within-subjects (e.g., comparing class-engagement across courses for students who had both an official-Facebook-course and a no-official-Facebook-course), and between-subjects (e.g., comparing campus-engagement and

identity for students who had at least one course with an official or an unofficial Facebook group, compared to those that had neither) analyses.

3. Results

3.1. Course Data

In calculating how many courses had an attached Facebook group, we noted some overlap of courses in the different categories (e.g., one student may have said a course had an unofficial/official Facebook group, others said it did not). We believe this may be caused by two reasons—different offerings of courses in the different semesters, and unofficial Facebook courses that not all students knew about. As if a student did not know about an unofficial Facebook course and did not join it, it could have no effect on our outcome measures, we did not consider this a concern for the interpretation of our results. However, this does mean the percentages in the following paragraph may add up to more than 100%.

In total, there were 1635 courses reported (per person $M = 3.47$, $SD = 0.92$, range 1-5), of which 474 were unique. Eight-hundred and ninety-nine (54.99%) of the total courses were reported as having neither an official nor unofficial Facebook group (per person $M = 1.91$, $SD = 1.28$, 357 unique courses, 75.32%). Seven-hundred and thirty-six of the total courses (45.02%) were reported as having either an official or an unofficial Facebook group (per person $M = 1.56$, $SD = 1.20$, 201 unique courses, 42.41% of unique courses). Five-hundred and nine of the total courses (31.32%) had an official Facebook group (per person $M = 1.08$, $SD = 1.14$, 101 unique courses, 21.32% of unique courses) and 348 (21.28%) had an unofficial Facebook group (per person $M = 0.74$, $SD = 1.04$, 159 unique courses, 33.54% of unique courses). One-hundred and twenty-one courses (7.40%, 50 unique, 10.55% of unique courses) had both an official and an unofficial Facebook group. Put another way, 23.77% of the total, and 49.51% of the unique courses with an official Facebook group, also had an

unofficial Facebook group. Table 1 displays frequencies of students with an official, unofficial,

Table 1

Number of Students in the Official Facebook course and in the No Official Facebook Course, with and without Unofficial Facebook groups.

Facebook category type	Number of Students
With an official Facebook (any course)	283
With an unofficial Facebook (any course)	204
With an official or unofficial Facebook (any course)	367
With an official Facebook (any course) but no unofficial Facebook (any course)	163
With no Facebook in any course	104

Note. The above categories are not mutually exclusive

Two-hundred and eighty-three participants had a least one course with an official Facebook group, and one for each participant was randomly selected as the official-Facebook-course (75 unique courses). Of these courses, 60 (25.21%) also had an unofficial Facebook group (32 unique courses, 42.67% of unique courses, see Table 2). Four-hundred and twenty-eight participants had at least one course without an official Facebook group, and one for each participant was randomly selected as the no-official-Facebook-course (205 unique courses). Of these courses, 81 (18.92%) had an unofficial Facebook group (58 unique courses, 28.29% of unique courses, see Table 2).

Table 2

Number of Students in the Official Facebook course and in the No Official Facebook Course, with and without Unofficial Facebook groups.

	With an unofficial Facebook	Without an unofficial Facebook
Official Facebook course	60	223
No official Facebook course	81	347

3.2. Modality and Other Online Tools

In order to eliminate the possibility that courses with an official Facebook were more likely to be presented online (which would affect the results), we compared the modalities of the official-Facebook-course compared to the no-official-Facebook-course. As can be seen in Table 3, the modalities of the randomly selected courses with and without an Official Facebook group were approximately equivalent, and a chi-square test of independence revealed no significant differences in the distributions ($\chi^2(2, N = 711) = 5.11, p = .08$).

Table 3

Number of Participants across Modalities of Courses with and without an Official Facebook

Modality	Official Facebook group course		No official Facebook group course	
	<i>n</i>	%	<i>n</i>	%
Face-to-face	237	83.75%	361	84.35%
Face-to-face, but with a significant portion of activities delivered only online (i.e., lectures or tutorials only available online)	21	7.42%	17	3.97%
Online	25	8.83%	50	11.68%
Total	283		428	

Table 4 displays other online tools which were used in the official-Facebook-course and the no-official-Facebook course. A chi-square test of independence was conducted for

tools with sufficient cell sizes (over five) to see whether the distributions differed. Though the use of “Discussion board or forum (such as Blackboard)” was high across both types of courses, there was a significant difference in the distributions, with the no-official-Facebook course having a greater usage of other discussion boards.

Table 4
Percentage of Participants who Indicated Another Online Tool was used in the Official-Facebook-Course and the No-Official-Facebook-course

Other online tool	Official-Facebook-course	No-official-Facebook-course	χ^2
Discussion board or forum (such as Blackboard)	61.68%	73.14%	10.01**
Blogs	0.70%	2.83%	
Chat rooms	4.91%	5.65%	0.19
Twitter	0.23%	0.00%	
Other	4.21%	10.25%	0.44

Note. Chi-square test for independence was only conducted where all cell sizes were greater than five.

n for official-Facebook-course = 283. *n* for No-official-Facebook-course = 428.

** $p < .01$.

3.3. Interactions with Facebook

A chi-square test of independence was conducted to assess differences in the distributions of the types of interaction official Facebook sites versus unofficial Facebook groups. A significant chi-square result would indicate a difference in the distributions of the data. As can be seen in Table 4, there were significant differences in the distributions of interaction with the Facebook groups around replying to posts or comments, posting questions, and posting pictures or memes. A comparison of the percentages would indicate that students do these activities more frequently in unofficial, compared to official Facebook groups.

3.4. Student Opinions

We compared student opinions on the usefulness of Facebook for courses with an official Facebook versus courses with an unofficial Facebook, using a chi-square test. A

significant chi-square result would indicate a difference in the distributions of the data. This was conducted on all available data, and such comprises participants who had an Unofficial Facebook course that may or may not have also had an Official Facebook course. As can be seen in Table 5, the only significant difference in distributions of student opinions was for increasing interaction with subject staff, which is to be expected due to the lack of formal staff interaction in the unofficial Facebook groups.

Table 5

Frequency of Interaction with courses with an Official and Unofficial Facebook group

Interaction	Official Facebook group ^a						Unofficial Facebook group ^b						χ^2
	Never	Once or twice	Once or twice a month	Once or twice a week	Every day	Multiple times a day	Never	Once or twice	Once or twice a month	Once or twice a week	Every day	Multiple times a day	
Liked (or another Facebook emoji) a post or comment	30.74%	23.32%	13.43%	26.15%	3.53%	2.83%	28.00%	16.00%	9.33%	36.00%	6.67%	4.00%	6.09
Replied to a post or comment	51.24%	22.97%	12.37%	10.25%	1.77%	1.41%	34.67%	14.67%	20.00%	18.67%	5.33%	6.67%	20.81***
Posted a link to external material (e.g., videos, external links)	76.33%	12.01%	4.95%	4.59%	0.71%	1.41%	68.00%	12.00%	9.33%	10.67%	0.00%	0.00%	7.81
Posted a question	65.02%	19.08%	8.83%	4.95%	1.06%	1.06%	45.33%	21.33%	14.67%	17.33%	1.33%	0.00%	18.83**
Posted a picture or meme	83.39%	8.48%	1.77%	4.24%	1.41%	0.71%	66.67%	12.00%	9.33%	10.67%	0.00%	1.33%	18.72**
Checked for new activity on the Facebook page or group	18.37%	14.84%	9.54%	34.98%	17.31%	4.95%	14.67%	14.67%	16.00%	30.67%	14.67%	9.33%	5.25

Note. ^a $n = 283$. ^b $n = 75$. Chi-square test was conducted on observed data, not percentages.

** $p < .01$. *** $p < .001$.

Table 6

Frequency of Interaction with courses with an Official and Unofficial Facebook group

Student opinion	Official-Facebook-course ^a					Unofficial Facebook group ^b					χ^2
	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
The [official/unofficial] Facebook group for [COURSECODE]											
Increased interaction with subject staff	2.12%	6.71%	22.97%	51.59%	16.61%	25.33%	30.67%	28.00%	12.00%	4.00%	103.58***
Increased interaction with fellow students	1.77%	6.01%	17.31%	56.18%	18.73%	1.33%	2.67%	16.00%	48.00%	32.00%	7.00
Increased participation in general discussions about subject topics	2.12%	9.54%	20.14%	50.53%	17.67%	2.67%	5.33%	17.33%	49.33%	25.33%	3.36
Was useful for providing notifications or reminders (e.g., lecture note availability, upcoming assignments)	2.12%	3.18%	15.55%	50.53%	28.62%	2.67%	4.00%	16.00%	46.67%	30.67%	0.47
Increased exposure to relevant external content (e.g., videos, external websites)	1.77%	5.65%	19.79%	49.47%	23.32%	5.33%	6.67%	28.00%	42.67%	17.33%	6.50
Facebook is an effective learning tool ^c	1.41%	7.77%	19.08%	51.59%	20.14%	2.56%	7.69%	12.82%	58.97%	17.95%	1.47
You would recommend Facebook as a learning and teaching tool in future subjects ^c	3.18%	8.13%	20.49%	46.29%	21.91%	5.13%	7.69%	7.69%	61.54%	17.95%	5.26

Note. ^a $n = 283$. ^b $n = 75$. ^cDue to the global nature of these questions, these questions were only asked to the students in the unofficial Facebook group category if they did not have an official Facebook in another course. N for these questions for the unofficial Facebook group condition is 39. Chi-square test was conducted on observed data, not percentages.

*** $p < .001$.

3.5. Engagement and Student Identity

In order to examine differences in campus-engagement and identity, we conducted between-subjects *t*-tests comparing students who had at least one course with an official or unofficial Facebook group, versus those students who had neither. The results are presented in Table 6, along with a converted effect size (Lakens, 2013) and indicate that students who had a course with a Facebook group (either official or unofficial) had increased sense of belonging and student identity.

Table 7

T-test for Between-Subjects Differences for Students who had a Course with a Facebook Group (Official or Unofficial) Compared to those who did not

Variable	Facebook group (unofficial or official) in any course			No Facebook group in any course			<i>t</i>	Hedges <i>g</i> _s
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>		
Valuing	367	4.26	0.60	104	4.31	0.66	0.70	0.08
Sense of belonging	367	3.57	0.69	104	3.37	0.75	-2.53*	0.28
Degree identity	367	3.89	0.71	104	3.66	0.76	-2.84**	0.32

Note. **p* < .05. ***p* < .01.

We were concerned about the direction of causality in these analyses. It may be that students with a greater sense of belonging and degree identity *create* and are invited to join unofficial Facebook groups (i.e., a sense of belonging and degree identity are influencing the formation of unofficial Facebook groups). As such, we conducted a second analysis, which only compared students who had an official (and no unofficial) Facebook group in any course to those who had no Facebook groups in any courses. As an official Facebook group is not student initiated, and all students in the course are invited, it seems less likely that a sense of belonging or identity would influence the creation of these groups. The results of these analyses are presented in Table 7 and indicate that there is still a significant difference in

sense of belonging, and a similar magnitude effect size, though there was no longer a significant difference for degree identity.

Table 8

T-test for Between-Subjects Differences for Students who had a Course with an Official Facebook Group but did not have any courses with Unofficial Facebook Groups, Compared to those Students who had no Facebook groups

Variable	Official Facebook group (in any course) but no unofficial Facebook (in any course)			No Facebook group (in any course)			<i>t</i>	Hedges <i>g</i> _s
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>		
Valuing	163	4.21	0.62	104	4.31	0.66	1.22	0.15
Sense of belonging	163	3.54	0.65	104	3.37	0.75	-1.98*	0.25
Degree identity	163	3.79	0.68	104	3.66	0.76	-1.41	0.18

Note. **p* < .05.

In order to investigate differences in class-engagement, we conducted within-subjects *t*-tests. To examine differences in relationships with faculty members, we compared course specific ratings for people who had an official-Facebook-course, and a no-official-Facebook-course. The results are presented in Table 8 along with analyses for other class-engagement scales, included for the sake of completeness. Note, in order to maintain power, and as unofficial Facebook groups should not affect staff relationships, the official-Facebook-course may also have included unofficial Facebook groups. The results indicate a significant difference in relationships with faculty members. Note, we would not expect to see differences in peer relationships, as the no-official-Facebook-course would also contain courses with an unofficial Facebook group.

Table 9

T-test for Within-Subjects Differences for Courses with an official Facebook Group Compared to those without an official Facebook Group

Variable	<i>n</i>	Official-Facebook-course		No-Official-Facebook-course		<i>t</i>	Hedges <i>g_{rm}</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Relationships with faculty members	240	3.90	0.60	3.78	0.69	2.31*	0.19
Peer relationships	240	3.63	0.78	3.55	0.79	1.28	0.11
Cognitive-engagement	240	3.87	0.61	3.82	0.59	1.01	0.07
Behavioural-engagement	240	3.98	0.62	3.99	0.57	-0.33	0.02

Note. In this analysis, the official-Facebook-course and the no-official-Facebook-course may also have had an unofficial Facebook group. * $p < .05$.

In order to investigate differences in peer relationships, we first conducted a within-subjects analysis, comparing course ratings for the official-Facebook-course and the no-official-Facebook-course, after removing participants who had an unofficial Facebook connected to their no-official-Facebook course. Note, in order to maintain power, and consistent with our prediction that courses with a Facebook group (official or unofficial) would have increased peer engagement, the official-Facebook-course may also have included unofficial Facebook groups. The results of this analysis is presented in Table 9, and indicates a significant difference in peer relationships.

Table 10

T-test for Within-Subjects Differences for Courses with an official Facebook Group Compared to those without an Official or Unofficial Facebook Group

	<i>n</i>	Official-Facebook-course		No-Official-Facebook-course with no unofficial Facebook		<i>t</i>	Hedges g_{rm}
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Relationships with faculty members	203	3.90	0.60	3.78	0.68	1.99*	0.18
Peer relationships	203	3.63	0.78	3.48	0.80	2.13*	0.19
Cognitive-engagement	203	3.86	0.62	3.80	0.58	1.31	0.11
Behavioural-engagement	203	3.99	0.62	3.98	0.59	0.33	0.02

Note. In this analysis, the official-Facebook-course may also have had an unofficial Facebook group. * $p < .05$.

As a separate analysis of the effect of Facebook groups on peer relationships, we conducted a between-subjects *t*-test for the no-official-Facebook-course, comparing those students who had an unofficial Facebook group to those students who did not. The results of these analyses are presented in Table 10, and indicate greater peer relationships for those students who have a course with an unofficial Facebook.

Table 11

T-test for Between-Subjects Differences for Students with an unofficial Facebook Group Compared to Those Without one in the no-Official-Facebook-Course

	Courses with an unofficial, but not official Facebook			Courses with no unofficial or official Facebook			<i>t</i>	Hedges g_s
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>		
Relationships with faculty members	81	3.67	0.80	347	3.78	0.70	1.26	0.16
Peer relationships	81	3.61	0.76	347	3.35	0.85	-2.54*	0.31
Cognitive-engagement	81	3.90	0.59	347	3.80	0.61	-1.41	0.17
Behavioural-engagement	81	4.10	0.49	347	3.96	0.59	-2.00*	0.25

Note. * $p < .05$.

At the suggestion of an anonymous reviewer, we investigated the relationship between interaction with the Facebook groups and engagement. To do this, we first factor analysed the Frequency of Interaction with Facebook groups items using principal axis factoring and direct oblimin rotation. Inspection of the scree plots and factor loadings revealed two interpretable factors: active interaction (Replied to a post or comment; Posted a link to external material [e.g., videos, external links]; Posted a question; Posted a picture or meme), and passive interaction (Liked [or another Facebook emoji] a post or comment; Checked for new activity on the Facebook page or group). These items were averaged to form active and passive interaction scales, and correlated with the engagement scales. As can be seen in Table 11, in the official-Facebook-course, both active and passive interaction was associated with all types of engagement. In the No-official-Facebook course (has unofficial Facebook), active interaction was more consistently associated with engagement (except for relationships with faculty members) than passive interaction.

Table 12

Correlations Between Active and Passive Interaction and Engagement

	Official-Facebook-course ^a		No-official-Facebook course (has unofficial Facebook) ^b	
	Active interaction	Passive interaction	Active interaction	Passive interaction
Cognitive-engagement	.19**	.25***	.32**	.09
Relationships with faculty members	.16**	.23***	.23	.16
Behavioural-engagement	.21***	.27***	.31**	.06
Peer relationships	.28***	.30***	.44***	.27*

Note. ^a = 283. ^b = 75. In this analysis, the official-Facebook-course may also have had an unofficial Facebook group

*** $p < .001$. ** $p < .01$. * $p < .05$.

4. Discussion

The main purpose of this study was to investigate whether courses with a Facebook group attached had increased student engagement. We expected that students with a

Facebook group attached would have increased sense of belonging, and increased degree identity. The results for a sense of belonging suggest that students with either an official or unofficial Facebook group in at least one of their courses did have an increased sense of belonging, which is consistent with researchers who have indicated that course Facebook groups may increase a sense of belonging (e.g., Barczyk, 2013; Hung and Yuen, 2010; Hurt et al., 2012; Kabilan et al., 2010; McCarthy, 2010).

However, the results for degree identity are more mixed. While students with any type of Facebook group did have an increased degree identity compared to those who did not, this difference disappeared when only considering official Facebook groups compared to no Facebook groups. As such, it is not possible to say that official Facebook groups are related to increased degree identity, and the effect of Facebook groups on degree identity may be due to unofficial Facebook groups. We propose two explanations for this. Firstly, it is possible that those who have a strong identity with their degree are more likely to create their own Facebook groups. For instance, students who are connected and identify with their degree and each other, may be more likely to create their own unofficial Facebook groups in order to communicate with, and support each other. A second explanation is that unofficial Facebook groups lead to increased degree identity due to increased student communication in an informal and unsupervised environment. In the current study, we found increased responses to posts or comments, questions, and posts of pictures or memes in the unofficial compared to official Facebook groups. These two explanations are not mutually exclusive, and it is possible (or even likely) that it is a combination of both.

As expected, we found that students reported significantly higher relationships with faculty members in courses with an official Facebook group, compared to courses without an official Facebook group. Previous research has suggested that students' believe that Facebook may be beneficial for increasing interaction with staff and other students (Irwin et

al., 2012). As the official Facebook group allows two-way student-staff communication in a less structured and formal environment than class (Barczyk, 2013), the increase in relationships with faculty members are to be expected. This is reflected in the student opinion data, which suggested that the official (but not unofficial) Facebook group increased interaction with subject staff.

We predicted that students with courses with a Facebook group (either an official or an unofficial) would report greater peer relationships. We found evidence for this in two analyses. Firstly, in within-subjects analysis, students reported greater peer relationships in courses with an official Facebook group, compared to courses without an official or unofficial Facebook group. Secondly, in a between-subjects analysis, in the no-official-Facebook-course, students with an unofficial Facebook group reported higher peer relationships than students without an unofficial Facebook group. We would caution against the over-interpretation of the second of these results. As with the results for identity, it is possible that greater initial peer relationships lead to the formation of unofficial Facebook groups. However, the fact that both of these results supported our prediction suggests that it is likely that course Facebook groups are associated with greater peer relationships. As with relationships with faculty members, this is likely due to Facebook groups enabling two-way interaction with peers in a semi-informal setting (Barczyk, 2013).

We found a significant difference on behavioural-engagement for students with versus without an unofficial Facebook in the no-official-Facebook course. As we did not predict this relationship, we would caution against its' interpretation. It may be that students with an unofficial Facebook group are more exposed to group norms, thus resulting in increased behavioural-engagement. However, this requires further research.

Finally, an additional analysis suggested by an anonymous reviewer found that students' interaction with the official and unofficial Facebook groups was related to class-

engagement. This matches with the results found by Dyson et al. (2015), and is perhaps unsurprising, as it would be expected that the more students interact with Facebook groups (either interacting actively, by posting content, or more passively, by checking for new content and “liking” posts) they more likely they are to see benefits from the Facebook groups. That is, if someone does not view the Facebook groups, they are unlikely to have any effect. However, caution must again be made in the interpretation of these results, as it could be that the students who are already engaged in the classes are those that interact more with Facebook, rather than Facebook leading to increased engagement.

Though outside the purpose of this article, it is worth noting the relatively high uptake of both official (21.32% unique courses) and unofficial (33.54% unique courses) course Facebook groups. This indicates two things. Firstly, it appears that the use of Facebook for university courses by faculty is not uncommon. Secondly, students appear to be readily willing to create their own course Facebook groups, regardless of whether the course has an official Facebook group or not. Indeed, 49.51% of the unique courses with a Facebook group, also had an unofficial Facebook group. These results highlight increasing ubiquity of course Facebook groups, and serve to highlight the importance of future research.

4.1. Limitations and Future Directions

As we sought to investigate a broad range of courses and Facebook groups and increase external validity compared to previous studies, our study was cross-sectional. However, because of this, we are unable to infer causality in our results. This is particularly problematic for the interpretation of two aspects of our results. Firstly, though our results found increased relationships with faculty members in courses with an official Facebook group, it is possible that faculty members who are open to student communications create course Facebook groups. An experimental or quasi-experimental design could eliminate this possibility, though at the cost of broader external validity. An alternative option would be to

collect data on teaching approaches, such as by measuring students' perceived staff communication. For instance, Imlawi, Gregg, and Karimi (2015) measured student perceived instructor self-disclosure and humour on a course Facebook group, and found that these communication variables were related to increased student engagement. Secondly, our results indicated that unofficial course Facebook groups may be related to students' degree identity. However, we are unable to identify whether students' elevated initial degree identity leads to the formation of unofficial Facebook groups, or unofficial Facebook groups increased students' degree identity. This may be further investigated by a pre-post design, where data is collected at both the beginning and end of the course.

It is worth noting that although we found significant results, the effect sizes were small. However, as this study covered a large number of implementations of Facebook groups, we expect that research with greater control of extraneous variables may find stronger effect sizes for the following reasons. Firstly, there was likely a large degree of variance in how (particularly official) Facebook groups were used. It seems likely that there would be different purposes for different implementations of both official and unofficial Facebook groups. For instance, in the case of official Facebook groups, the intended use and implementation could be to enable staff to post content and notifications, to encourage peer-to-peer discussion, to enable a forum for questions, and/or to enable student content development, to name a few. Additionally, in the official Facebook groups there is likely large variance across courses in both the quantity and the quality of staff-student interaction. Secondly, we did not control for potential individual-level variables. Though we found that interaction with the Facebook groups was related to class engagement, in our group level comparisons we did not exclude participants with low levels of Facebook interaction, which may cause an underestimation of true effect sizes. We would also expect that other individual-level variables (e.g., personality, academic motivation) may influence, and

potentially moderate, the effect of Facebook groups on engagement. Future research may benefit from collecting more course- and teacher-level, as well as student-level data.

Consequently, while the found effect sizes were small, there is reason to believe they may be (or can be) larger in practice, and the fact that attaching a Facebook group to a course is a low resource-cost intervention, may mean that this is an area deserving of further research.

Finally, we found an unexpectedly high proportion of unofficial course Facebook groups, however a focus on unofficial Facebook groups was beyond the scope of this study. As such, we did not collect detailed data on the unofficial Facebook groups (such as purpose, and number of students included). The unexpectedly high proportion of unofficial Facebook groups, and the possible relationship between unofficial Facebook groups and students' degree identity, indicates that future research may benefit from a more detailed investigation of these types of Facebook groups.

4.2. Conclusion

To our knowledge, this was the first study to investigate the relationship between course Facebook groups and student engagement across a broad variety of courses. The finding that official course Facebook groups are related to increased relationships with faculty members, that Facebook groups in general are related to increased peer relationships and sense of belonging, and that unofficial Facebook groups are related to increased student' degree identity, indicates that Facebook groups may be a useful addition to university courses. Future research may benefit from controlling for staff's teaching approach and communication style, students' initial degree identity, and a more detailed analysis of the use of unofficial course Facebook groups.

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