Social media and higher education: introversion and collaborative learning from the student's perspective

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Abstract: The aim of this study is to understand how social media contribute to face-to-face collaborative learning by introvert students in higher education. A total of 233 students participated. This study shows that more introvert students perceive that social media are more helpful for increasing their collaborative learning performance and self-confidence. These students feel that their true nature is hampered in face-to-face contact and prefer to communicate via social media rather than face-to-face communication. Additionally, all students in this study signal that they wish their educators to make more use of social media. HE institutions are therefore recommended to make more use of social media to enhance collaborative learning.

Keywords: social media; higher education; introversion; collaborative learning; higher learning; computer mediated learning; self-confidence; Web 2.0 learning; real self; true nature; introvert students; extrovert students; performance; learning styles; preferences; learning environment.

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1   Introduction

At the dawn of the new journal of *International Journal of Social Media and Interactive Learning Environments*, it is good to introduce this article as a synthesis of educational-, media- and communication-based disciplines. The recent study on the motive and relevance of online friendship revealed four types: person-focused, online-connections, achieving purposes, and finally dedication (Damaschke and Kommers, 2012). It brought the evidence that students' communicative style has consequences for their later career as employers are sensitive to their profiles. Both the European Union (EU Commission, 2011), as well as the Dutch Government and its Education Council (Onderwijsraad, 2011), share a vision that their higher education (HE) systems play a crucial role in ensuring the long term international competitiveness of an envisioned EU knowledge economy. In this context, the Dutch Education Council therefore expresses the desire, with urgency, for HE institutions to train and coach students in an effective way. The students would become broadminded global citizens, master their subjects, and have advanced competencies in the areas of analysis, creativity, problem solving, and the skills required for effective multidisciplinary and intercultural collaboration. In other words, the promotion of higher-level learning and collaborative skills has become an urgent priority in Europe.

The potential for social media as a facilitating tool in achieving higher level learning results, through collaboration with others, seems obvious and is also supported by literature (Brown, 2012; Junco et al., 2011; Meyer, 2010; Novak et al., 2012; Redecker et al., 2010). The potential of social media is further recognised in a UNESCO policy document (Kommers, 2011), which calls for a period of experimentation with social media and to allow them in the classroom to gauge their strengths and weaknesses. For this to be successful, however, it also requires a more exact understanding of the perceptions that students in HE entertain with regards to the benefits of social media.

What types of students expect to benefit the most of the use of social media in HE? Is it different for extrovert and introvert students? Although both extrovert and introvert students seem to prefer face-to-face communication, the more introvert students tend to be more active in the use of social media (Goby, 2006). It is suggested that the more introvert students expect to benefit most from the use of social media as it offers them the opportunity to communicate more freely and more in line with their true nature than in face-to-face meetings (Amichai-Hamburger et al., 2002; Bargh et al., 2002).

Based upon literature one expects that the possibility for introvert students, being able to express themselves more freely and fully online through social media also, potentially, constitutes a form of social training. It ultimately could strengthen their social confidence in such a way that they will feel more confident in face-to-face collaborative learning. Taking the literature and objectives of the Dutch Education Council (Onderwijsraad, 2011) as a starting point, this study therefore aims to contribute to more understanding of the perceived potential of social media to contribute to face to face collaborative learning by introvert students in HE.

In part two of this paper, learning, social media and relevant terms will be discussed. Also, the research objectives, questions, and hypothesis will be presented. In part three, the research method will be described. The results will be illustrated in part four.

2 What are collaborative learning, higher-level learning and what skills are necessary?

Von Glasersfeld (1989), a famous philosopher on education, who presents himself as a constructivist, posits that learning consists of the formation of cognitive schemes, induced by the observation of a new experience. This experience disturbs the equilibrium of existing schemes, forcing the learner to create a new equilibrium by constructing a revised scheme. The most frequent source of new experiences is often provided by others. Hence collaborative learning is helpful for students to work together on problems to find their own solutions.

In order to bring the latest insights to the logic and structure of the process of cognitive learning, Anderson and Krathwohl (2001), refined the widely used model of Bloom's taxonomy of learning. They defined learning into six different levels of complexity ranging from remembering, understanding and applying to analysing, evaluating and ultimately creating of knowledge. It is in particular the second half of this model that is considered as higher learning and which is predominantly obtained by working with and watching others (Bandura, 1989).

Working, as well as learning well with others requires certain collaborative skills. Hermsen et al. (2010), define those as active listening, receiving and giving feedback, honouring one's commitments, contributing to fair division of tasks, being assertive, the co-creation of a good collaborative atmosphere and taking responsibility.

2.1 Current perspectives on the potential of collaborative learning with social media in HE

The current internet, sometimes also called Web 2.0 (O'Reilly, 2007), allows for much more interaction, collaboration and modifications by its users (Kaplan and Haenlein, 2010) than its predecessor, web 1.0, which was more static in character and allowed for less interaction (Naik and Shivalingaiah, 2008). Compared to regular websites, social media are in particular applications that offer a multitude of different ways for people to work together. They consist of many different types of tools, as listed by Kaplan and Haenlein (2010, p.62), like "collaborative projects (e.g. Wikipedia), blogs, content communities (e.g. YouTube), social networking sites (e.g. Facebook), virtual game worlds (e.g. World of Warcraft) and virtual social worlds (e.g. Second Life)".

Different social media are being used in HE and some literature about their use and benefits is emerging. The use of social media is not only for the transfer of knowledge but, more importantly, also for more collaborative and higher learning and as a support to the development of higher-level cognitive skills like reflection and metacognition (Redecker et al., 2010). This was, for instance, demonstrated by Lárusson and Alterman (2009) as well as Ertmer et al. (2011), in experiments with students, using Wiki's. Meyer (2010) found indications that using social media in an assignment with students indeed led to higher level learning, as defined by bloom's taxonomy, especially in the case of online discussions. Also evidence was found for the potential contributions to collaborative learning of Twitter, a micro-blogging tool (Junco et al., 2011) and social annotation tools (Novak et al., 2012).

2.2   How do introversion and extroversion influence social media usage?

Whilst extroverts need to be stimulated by being around others, introverts obtain their energy from within. Extrovert people, more than the introvert, also have a tendency to need excitement, physical activity and social interaction (Hills and Argyle, 2001). Introvert people need fewer friends and less external stimulation. Orchard and Fullwood (2010, p.158) state that "introverts were significantly more likely to be drawn toward online communication than extraverts". They are more attracted to online communication than extroverts (Goby, 2006) because of the lack of intimidating features that accompany face-to-face communication (Orchard and Fullwood, 2010).

That is one of the explanations why introvert people prefer online communication, which is also hypothesised (Amichai-Hamburger, et al., 2002) to offer more opportunities to be in touch with their 'real me' as opposed to extroverts that locate their 'real me' more in offline communications with others. This distinction is important since it has also been asserted that being in balance with one's true nature has a profound effect on psychological wellbeing and is thus searched for (Amichai-Hamburger et al., 2002; Bargh et al., 2002).

Internet and social media are used by people for various reasons (Voorn, 2012), such as for instance self-expression, building and maintaining relationships with others, to entertain themselves or for debating and other functional reasons (Brandtzæg and Heim, 2011; Kalmus et al., 2011; Lin and Lu, 2011). The more extraverted, exhibitionistic and narcissistic people appear to be attracted especially to Facebook (Correa et al., 2010; Nadkarni and Hofmann, 2011; Ryan and Xenos, 2011). Also of interest to note is the difference in preference between asynchronous, e.g., blog posts, and synchronous communication, for instance chatting, whereby extrovert users seem more at ease with the latter and introvert people prefer asynchronous communication (Ellis, 2003; Ryan and Xenos, 2011).

2.3   Research objectives

Two objectives are being pursued in this research. Firstly, it seeks to complement the existing body of literature with insights towards students, and particularly of those with a higher score on introversion, perceived benefits of the use of social media in face-to-face collaborative learning. Secondly, the objective is to make recommendations towards the promotion of social media as a potential tool in HE for achieving higher level learning results.

2.4   Research question

The main question for this study is: To what extent does the use of social media by introvert students contribute to face-to-face collaborative learning activities in HE as perceived by students themselves? To operationalise the main question, five concrete research questions (RQ) have been devised:

RQ1   To what extent do students consider social skills to be essential in collaborative learning?

RQ2   How do students consider their own efficacy in relation to group social skills?

RQ3   How do students consider their own efficacy in relation to the use of social media?

RQ4   To what extent do introvert students consider social media to help them in their collaborative learning performance?

RQ5   To what extent do introvert students perceive social media to help them to develop their face-to-face interaction?

2.5   Hypothesis

It is assumed that the degree of introversion/extroversion will influence how students judge the importance of social skills when working together with others. It is suggested that introvert students judge these social skills lower than extrovert students, because their opinions will probably converge with their own perceived skills. It can, however, be expected that those that score higher on the importance of groups social skills will probably also score higher on their own social skill efficacy.

H1a   Introvert students find that social skills are less essential in working together with others than extrovert students.

H1b   Those that score higher on the importance of group social skills will also score higher on their own social skill efficacy

Since it is assumed that introvert students consider social skills as less important, it follows logically that they will score themselves also lower than extrovert students on their own perceived group social skills.

H2   Introvert students score themselves lower than extrovert students on group social skills.

Introvert students will feel more attracted to using social media instead of pursuing face-to-face contact. Hence it is assumed that they will also score themselves higher on their own social media efficacy. It is, however, expected that those that score themselves lower on social media efficacy will probably also tend to score lower on perceived collaborative learning results due to their social abilities.

H3a   Introvert students score themselves higher than extrovert students on their own social media efficacy.

H3b   Those that score lower on social media efficacy will also score lower on perceived collaborative learning results.

Introvert students will probably have less preference for collaborative learning than extrovert students due to un-comfortableness with some elements of face-to-face contact. For the same reason, they will probably prefer non-collaborative learning.

H4a   Introvert students prefer collaborative learning less than extrovert students.

H4b   Introvert students prefer non-collaborative learning more than extrovert students.

Because introvert students are presumed to prefer the use of social media, it is expected that these offer them practice in social skills which they otherwise would have had less opportunities to develop, due to the fact that they feel less comfortable with face-to-face contact. Therefore they consider social media to offer them compensation in their

collaborative learning performance as well as the development of their face-to-face social skills. They will probably also prefer their lecturers to make more use of social media.

H5a   Introvert students' experience that the use of social media will help them more in their collaborative learning performance than extrovert students.

H5b   Introvert students perceive social media to help them develop their face-to-face interaction more than extrovert students.

H5c   Introvert students prefer that their lecturers make more use of social media than extrovert students.

The hypotheses have been implemented towards an assumed model for this research as shown in Figure 1.

Figure 1   Hypothesised model for the expected correlations between introversion/extroversion, the importance of group social skills, group skills efficacy and social media efficacy, collaborative and non-collaborative learning
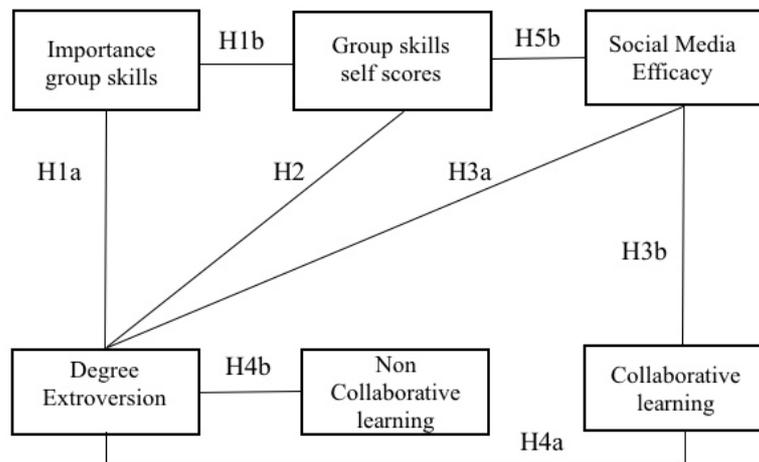
3   Research method

3.1   Participants

For this study, all 4,253 students of a faculty of a Dutch university of applied science were invited by e-mail to take part in an online questionnaire. Two hundred fifty three respondents participated in total. Of these, 20 were removed in total due to incompleteness (5) or not a faculty student (15).

3.2   Materials

An online Dutch questionnaire with in total 86 questions was used, of which one question was removed due to duplication.

The questionnaire covered the following topics:

1   A briefing: explaining the purpose of the survey, its estimated duration and guarantee of confidential treatment of all outcomes.

2   The Dutch version of the Big Five 44 Inventory (John et al., 1991, 2008) as far as it concerned only the questions on intro/extroversion on the basis of the work of Denissen et al. (2008), supplemented with two extra questions, others find me an introvert and others find me an extrovert. These in an effort to further strengthen the construct. In its original form it gives a reliable impression of a person's degree of introversion or extroversion.

3   A self-developed construct on the perceived importance of social skills in collaborative learning.

4   A construct originally developed by Hermsen et al. (2010), to measure the perceived self-efficacy on skills needed in working together with others.

5   A self-developed construct on the perceived social media self-efficacy.

6   Two self-developed constructs of which one defines non-collaborative learning activities and the other collaborative learning activities.

7   A list of eight separate questions to get an impression of certain topics outside of the constructs researched. Some of these were submitted by the participating institution and will not be discussed in this study.

8   A group of questions concerning the educational use of social media and private use as well as a group concerning the educational use of internet access equipment and private use of these. These questions were submitted for the participating institution and will not be discussed in this study.

9   A group of questions relating to which faculty, the total number of years of study, the year of the study and the age.

For all questions except those in 9, a five-point Likert scale was used, ranging from one, not important or applicable at all, to five, very important or very applicable. The five-point Likert scale was chosen due to its solidness and wide use.

3.3 Procedure

Before going online, the questions were first pretested with four students and two teachers to check logic and comprehension as well as the order of the questions and the time it takes to answer them. In the period of the 21st of May till the 25th of May, 2012, the questionnaire was online at www.thesistools.com. Respondents were invited via e-mail on the 21st of May to participate. Also, a group of students were requested by the researcher to post the link to the questionnaire on the Facebook pages of their classes. All raw data were exported from Thesis tools to Excel and subsequently into SPSS 20 for further analysis.

4   Results

The average age of the respondents (n = 233) was 21.6 years (SD = 2.35), as is represented in Table 1. On average the respondents were in their third year of study (M = 2.6, SD = 1.19) and in their fourth year of study after high school (M = 3.9, SD = 2.03).

Table 1   Respondents, average age, year of study and years of study after high school

Respondents N = 233	Mean (SD)
Age	21.6 (2.35)
In what year of your studies are you at this moment	2.6 (1.19)
How many years have you been studying after high school at this moment	3.9 (2.03)

4.1   The degree of extroversion and other construct scores

The constructs were tested for their inter-item reliability using the widely used measure of Cronbach's Alpha as is demonstrated in Figure 2. Generally, a score higher than 0.7 on Cronbach's Alpha signifies a high inter-item reliability.

Table 2   An overview of the average construct scores and standard deviations in combination with the Cronbach's alpha scores

Overview scores of constructs	Mean (SD)	Cronbach's alpha
Extended Big Five introversion/extroversion MeanIntroExtroext	3.62 (.65)	0.875
Perceived importance social skills in group work MEANSSimp	4.02 (.56)	0.621
Perceived self-score group work social skills MEANGA	3.93 (.37)	0.777
Perceived social media efficacy SMeff	3.02 (.77)	0.757
Perceived collaborative learning results MeanCL	3.24 (.67)	0.709
Perceived non-collaborative learning results MeanNonCL	3.24 (.67)	0.494

Four of the constructs scored a Cronbach's Alpha higher than 0.7; extended Big Five introversion/extroversion (0.875), perceived self score on social skills in group work (0.777), perceived social media efficacy (0.757) and perceived collaborative learning results (0.709). Perceived importance of social kills scored lower than 0.7 and will therefore only be used cautiously in the context of this research. The perceived non-collaborative learning results construct scored 0.494 and is therefore too low to be considered reliable.

The results show that students assign a high average value to the importance of social skills in relation to group work (M = 4.02, SD = .56), perceived self-score on group work social skills (M = 3.93, SD = .36) and extroversion (M = 3.62, SD = .65). In other words, in this research students score themselves relatively high on extroversion and are of the opinion that having social skills is very important when working together in groups. The respondents are also of the opinion that they are, on average, highly skilled in the art of working in groups.

In terms of to what degree the two different types of learning give the respondents the highest perceived results, it becomes clear that such is the case for collaborative learning (M = 3.24, SD = .67). The results for non-collaborative learning cannot be used due to

the low Cronbach's Alpha score. When the outcome of the separate questions in these constructs, is studied, interesting scores emerge however, as can be seen in Table 3.

**Table 3** An overview of the perceived learning scores on collaborative learning

Perceived learning	Collaborative style	Mean and (SD)
I learn the most when working on my own	Non-collaborative	3.7 (0.9)
I learn the most from in-class discussions on the topics we have to learn	Collaborative	3.6 (1.0)
I learn the most from small scale working lectures	Collaborative	3.6 (1.0)
I learn the most from group assignments	Collaborative	3.3 (1.0)
I learn the most from lectures	Non-collaborative	3.0 (1.1)

Working on one's own, which is non-collaborative learning, is apparently the learning method with the highest average perceived learning result (M = 3.7, SD = .9), followed by in-class discussions (M = 3.6, SD = 1.0), small scale working lectures (M = 3.6, SD = 1.0) and group assignments (M = 3.3, SD = 1.0) which are collaborative learning methods. Lectures, a non-collaborative learning method, only scores an average of 3.0 (SD = 1.1) and is thus the learning method with the lowest perceived learning result.

4.2 How do introversion/extroversion relate to, ultimately, face-to-face collaboration

On the basis of the Pearson correlation method, which is widely used in science, the assumed model constructs, see Figure 1, have been analysed for their linear dependency and, if present, the strength of such. These are displayed in Figure 2. Varying degrees of correlation were found between the six constructs of which most with a very high degree of significance. These will be discussed one by one. Where applicable the separate, direct, questions that were asked in the questionnaire and which pertain to some of the constructs, will be taken into account. For a full overview of the Pearson correlations of these questions please see Table 4.

Figure 2 Pearson correlation between constructs at significance levels of p lower than 0.05, * and lower than 0.001, **
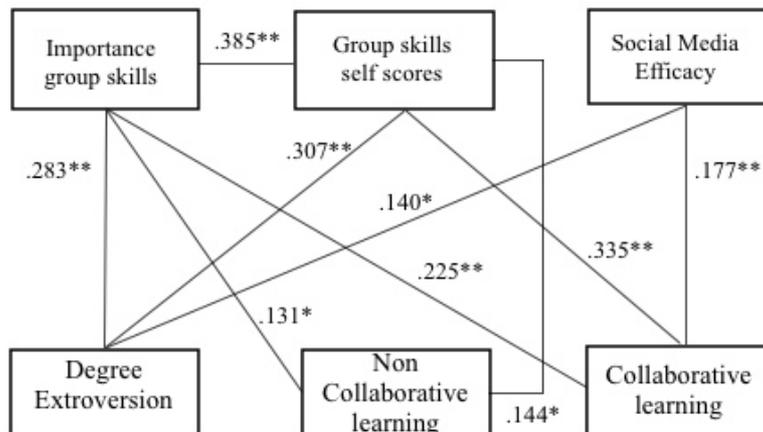
The results, in Figure 2, show that the assumed model, discussed in part 2, has to be adapted. Significant correlations were found on the hypotheses, H1a, H1b, H2, H3 and H3b. No significant correlations were observed on H4a, H4b and H5b. New, unforeseen, significant correlations were found, however, between the elements of the importance of group social skills and perceived non-collaborative ($r = .131$, $P < .05$) and collaborative learning results ($r = .225$, $P < .001$) as well as between the self efficacy scores on group social skills and collaborative ($r = .355$, $P < .001$) and non-collaborative learning ($r = .141$, $P < .05$).

4.3. The RQ and hypotheses

The RQ of this study was: To what extent does the use of social media by introvert students contribute to face-to-face collaborative learning activities in HE as perceived by students themselves? This question will be answered in this section with the help of the hypotheses that were formulated earlier.

4.3.1   Hypothesis H1a: introvert students do consider that social skills are less essential in working together with others than extrovert students

Hypothesis H1a is confirmed by this study and has to be accepted. The results show that students who regard themselves as more introvert very significantly tend to give a lower regard to social skills in group work ($r = .283$, $P < .001$).

4.3.2   Hypothesis H1b: students who score higher on the importance of group social skills will also score higher on their own social skill efficacy

Hypothesis H1b is accepted. The hypothesis is very significantly confirmed by this research ($r = .385$, $P < 0.001$). The expectation is therefore confirmed.

4.3.3   Hypothesis H2: introvert students tend to score themselves lower than extrovert students on group social skills

Hypothesis H2 is accepted since students who regard themselves as more introvert tend to score themselves, very significantly, lower with regard to their own perceived social skills in group work ($r = .307$, $P < .001$). This was as expected.

4.3.4   Hypothesis H3a: introvert students score themselves higher than extrovert students on their own social media efficacy

Hypothesis H3a is rejected in this study since students who score themselves higher on introversion score themselves very significantly lower on social media self efficacy ($r = .140$, $P < .05$). This was not as expected.

4.3.5   Hypothesis H3b: those that score lower on social media efficacy will also score lower on perceived collaborative learning results

Hypothesis 3b is confirmed in this study, as was expected and is hence accepted. The lower self scorers on social media efficacy indeed tended to, very significantly, score

lower on perceived collaborative learning results (r = .177, P < .001). Hypothesis 3b is therefore accepted.

4.3.6 Hypothesis H4a: introvert students prefer collaborative learning less than extrovert students and Hypothesis H4b: introvert students prefer non-collaborative learning more than extrovert students

Both hypotheses are rejected in this study. No correlation was found between introversion and a preference for either the construct of perceived non-collaborative learning or for collaborative learning. This was not as expected.

4.3.7 Hypotheses H5a, H5b and H5c: introversion and the help of social media with the collaborative learning performance

Table 4 Overview of correlation scores of the separate items with introversion/extroversion as well as their mean scores

Separate items, correlations with introversion and average scores (N = 233)	Introversion/extroversion correlation (significance)	Mean (SD)
Using social media has improved my social skills	−0.016 (.809)	2.45 (.99)
Using social media has improved my face-to-face interaction during my studies	−0.051 (.442)	2.11 (.95)
Using social media has increased my self confidence	−.172** (.008)	2.19 (1.09)
I prefer to communicate via social media over face-to-face communication	−.331** (.000)	1.79 (.94)
In face-to-face contact I am closest to my real self	.289** (.000)	3.95 (.96)
I prefer to work on group assignments via social media	−0.001 (.984)	2.53 (1.18)
Social media are a blessing to group assignments	0.121 (.065)	3.38 (1.22)
Our lecturers should make more use of social media	0.088 (.179)	3.11 (1.26)

4.3.7.1 Hypothesis H5a: introvert students experience that the use of social media will help them more in their collaborative learning performance than extrovert students

Given the, in majority, acknowledging outcomes, on the items associated with hypothesis H5a, this study accepts the hypothesis.

Hypothesis H5a was measured by using the items listed in Table 4. On average, neither the more introvert, nor the more extrovert students (no significant difference), feel that using social media has improved their social skills (M = 2.45, SD = .99). The same holds true for the item of "I prefer to work on group assignments via social media" (M = 2.53, SD = 1.18).

The more introvert students tend to agree more that the use of social media has increased their self confidence than the more extrovert students (r = −.172, P < .01) and they also tend to score very significantly higher (r = −.331, P < .001) on the item of "I prefer to communicate via social media over face-to-face communication". Additionally, the more introvert students also find that they are, very significantly, closer to their 'real self' when they do not have to communicate face-to-face (r = .289, P < .001), which, in the context of this study, is interpreted as a clear preference for online communication.

On average, both the more introvert as well as the more extrovert students (no significant difference), feel that social media are a blessing to work on group assignments (M = 3.38, SD = 1.22).

4.3.7.2   Hypothesis H5b: introvert students perceive social media to help them to develop their face-to-face interaction more than extrovert students

Hypothesis H5b is rejected in this study. The hypothesis was measured on the basis of the item: using social media has improved my face-to-face interaction during my studies. The outcome showed no significant difference between students who scored themselves as more introvert and students who scored themselves as more extrovert. Moreover, the average score on this item was also low (M = 2.11, SD = .95).

4.3.7.3   Hypothesis H5c: introvert students prefer more that their lecturers make more use of social media than extrovert students

Hypothesis H5c is also rejected in this study. No significant difference was found between the two types of students. However, given the high score (M = 3.11, SD = 1.26) it is clear that the students, at least at the institution, at which the study took place, would appreciate it if lecturers would make more use of social media.

4.3.8   Summary

The outcomes on the hypotheses in this study do give a direction towards a response to the overall RQ. Table 5 shows an overview of the hypotheses.

Table 5   Overview of the accepted and rejected hypotheses

Accepted hypotheses
H1a   Introvert students do consider that social skills are less essential in working together with others than extrovert students.
H1b   Students who score higher on the importance of group social skills will also score higher on their own social skill efficacy
H2   Introvert students tend to score themselves lower than extrovert students on group social skills
H3b   Those that score lower on social media efficacy will also score lower on perceived collaborative learning results
H5a   Introvert students experience that the use of social media will help them more in their collaborative learning performance than extrovert students
Rejected hypotheses
H3a   Introvert students score themselves higher than extrovert students on their own social media efficacy
H4a   Introvert students prefer collaborative learning less than extrovert students
H4b   Introvert students prefer non-collaborative learning more than extrovert students
H5b   Introvert students perceive social media to help them to develop their face-to-face interaction more than extrovert students
H5c   Introvert students prefer more that their lecturers make more use of social media than extrovert students

Students who see themselves as more introvert consider social skills as less essential in working together with others and also score themselves lower on these skills. They are indeed of the opinion that using social media will help them in their collaborative learning performance. This becomes especially relevant, when it is taken into consideration, that these students feel that their true nature is hampered in face-to-face contact and hence, prefer to communicate via social media over face-to-face communication. Their perception, that social media has increased their self-confidence, should be considered as an additional reason to conclude that the use of social media in HE can contribute to the collaborative learning outcomes of students who consider themselves as more introvert.

5 Concluding remarks

The aim of this study was to understand the potential of social media to contribute to face-to-face collaborative learning by introvert students in HE. There is not abundance in literature on the perspective of students on the use of social media and its benefits for collaborative learning in HE. In that respect, the outcomes of this study can be regarded as an addition to the understanding of the subject.

However, the students were recruited from a communication management and journalism faculty of a Dutch university of applied sciences. This might have biased this study since there may be differences in the ratio introversion/extroversion among students of different faculties. More research with students from other faculties is needed to ascertain this.

The method of research required a perspective of students themselves on the subjects that were studied. This implies that since the results are self-scores no causal relations can be inferred. Correlation and causal relation are two different things. More research is needed to determine if the perceived benefits of using social media in relation to collaborative learning by more introvert students are indeed realised.

For this study, only the Big Five element of extroversion was used. For a follow up study it might be of additional benefit to use all elements of the Big Five in order to capture the full spectrum of the personalities of the students involved.

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