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Autonomy, competence, and relatedness in foreign language learning through Facebook

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ABSTRACT

This article aims to explain differences between a group learning English on a Facebook page and a face-to-face group in terms of Self-Determination Theory (SDT). SDT focuses on three main variables, which improve self-determination and motivation outside but also inside the classroom: autonomy, competence and relatedness. The main research question was: how can we explain differences between a face-to-face group (FTF) and a Facebook group learning a foreign language in terms of autonomy, competence and relatedness? The results indicate that there was a significant difference between the two groups in terms of learning outcomes as well as in the three SDT variables. Students in the Facebook group felt more autonomous, competent and related. All three SDT variables correlated with learning outcomes. There was, however, almost no relationship among the SDT variables with learning outcomes within the two groups. The strongest predictor of the difference in learning outcomes proved to be relatedness, followed by competence.

1. Introduction

Online social networks such as Facebook, Twitter, YouTube, and Linked-in have recently attracted millions of people all over the world; they have resulted in significant changes in the field of communication and cooperation. They not only make it possible to easily send, receive and share information, but also to facilitate communication, interaction and cooperation with different people, companies and organizations in different parts of the world using various modalities such as writing, pictures, video or link sharing, and voice or video chat. In addition, these sites have become an important part of most students' lives (Boyd, 2007; Lomicka & Lord, 2011; Van den Beemt, Akkerman, & Simons, 2010; Yapıcı & Hevedanlı, 2014). Many universities and colleges having created various group profiles in these networks in order to keep up with students' needs, interests and demands. As a result, in recent years, researchers have investigated the potential of these networks in different teaching and learning fields (Ajjan & Hartshorne, 2008; Armstrong & Franklin, 2008; Jones, Blackey, Fitzgibbon, & Chew, 2010; Tiryakioglu & Erzurum, 2011).

Yu, Tian, Vogel, and Chi-Wai Kwok (2010) argue that an on-line social network has a direct impact on students' learning while also assisting them in adapting to the university culture, and thus gaining social acceptance from others. Jones et al. (2010) asserts that social networks can enhance formal learning, and become part of the educational ecosystem of students. Similarly, Greenhow and Robelia (2009) support and reinforce this idea by stating that online social networks serve as a complementary learning activity. In fact, online social networks, as a new technology, have been utilized in education due to their ease of application, simple accessibility, and individual affordance (Alexander & Levine, 2008).

Stevenson and Liu (2010), Godwin-Jones (2008) and Lloyd (2012) all argue that one of the most important functions of social networks is that they engage learners in authentic communication in meaningful contexts. Generally speaking, social networking from a theoretical viewpoint is well-established, can offer an effective eLearning setting (De-Marcos, Domínguez, Saenz-de-Navarrete, & Pagés, 2014), and have a high influence on learners' performance (De-Jorge-Moreno, 2012).

Given the fact that online social networks provide users with an easy way of interacting with speakers of various languages, as well as wider access to native speakers of the target language, online social networks can play an important role in the teaching and learning of foreign languages.

Lomicka & Lord (2011), who investigated the role of social networks in language learning, argue that the use of these networks is very helpful in language learning, but that, their theoretical and empirical perspectives have yet to be studied. Harrison

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and Thomas (2009) also concluded that social networks such as Livemocha environments provide new conditions of active learning. Brick, 2011a, 2011b also mentioned that, apart from the fact that social networks provide positive conditions for language learning, a major weakness was the poor quality of the learning materials. Blattner and Lomicka (2012) also argued that social networks can be a viable resource in language learning if students are taught the strategies to integrate them in the classroom. Lamy and Zourou (2013) note that, although social networks are attractive to learners and teachers, if we want them to work to the benefit of language learners, networks should focus on communities and the socialization of language learners. Lomicka and Lord (2011) and Sturm, Kennell, McBride, and Kelly (2009) also emphasized the importance of socialization and communication tools in social networks and believe that together they promote language learning. Moreover, a variety of facilities and capabilities of these networks, including the combination of many Internet-based communication instruments previously in wide but disconnected use, may be utilized to improve different linguistic skills (Brick, 2011a, 2011b). Many authors (e.g., Baralt, 2009; Clark & Gruba, 2010; Godwin-Jones; 2008; Harrison & Thomas, 2009; Lomicka & Lord, 2011) believe that these networks may effectively contribute to foreign language learning; that is, they offer efficient improvement of linguistic competencies and skills. However, there is not yet much empirical evidence that supports these claims.

1.1. Contribution and purpose

Thus, our fist aim is to empirically show that an online learning platform such as Facebook can be an effective environment to learn a foreign language for a specific group of students (see Section 3). Specifically, the purpose of the current study is to analyze differences between a group learning English through Facebook and a group learning English face-to-face in a classroom, in terms of Self-Determination Theory (SDT). This theory has been selected because different studies (Gunawardena, 1995; Howland & Moore, 2002; Mills, 2003; Tait, 2003) suggest that SDT is a suitable framework for analyzing student engagement and motivation in online learning environments. Furthermore, Noels, Pelletier, Clement, and Vallerand (2000) emphasize that the three orientations (autonomy, competence and relatedness) may also predict learning outcomes. As explained more fully in the next section, we hypothesize that an online network, such as Facebook, can help students feel more autonomous, competent and related to other students than in regular class environments and that the fulfillment of these three needs together help students to learn better. Although this seems plausible in theory and is mentioned by several authors, we did not find any empirical research that related SDT to the learning effectiveness of online learning environments. Our second contribution is to fill this gap: providing research on the relationship between motivation in terms of SDT and learning outcomes. Our third contribution is a theoretical one: elucidating the ways in which Facebook motivates students for foreign language learning and how this improves their learning outcomes.

2. Theory background

The main theory behind our research is SDT. Self-Determination Theory is a general theory of human motivation and personality (Deci & Ryan, 1985), which focuses on the dialectical relationships between growth-oriented human beings and social contexts that facilitate or impede people's motivation to actualize their potential (Deci & Ryan, 1985, 2002; Deci, Vallerand, Pelletier, & Ryan, 1991). In their 1994 study, Deci and Ryan specified three factors that improve self-determination in the classroom: autonomy (self-determination in resolving what to do and how to do it), competence (developing and implementing skills for the manipulation and control of the environment), and relatedness (association with others through pro-social relationships). We highlight these three concepts in more detail in the next section and relate them to foreign language learning in a Facebook environment.

Autonomy: Autonomy refers to the degree of choice that students have when they perform academic tasks, as well as the degree of choice they have regarding when and how to perform them (Pintrich & Schunk, 1996). Autonomy is present when students can solve problems in their own ways (Valas & Solvik, 1993). This also happens through the choices they can make during the learning process (Brophy, 2004); these choices help them become more independent and self-directed in making decisions regarding their learning.

We expect that the Facebook environment, which is free from time and space limitations and makes access possible to various people and resources, helps students solve their problems in their own time, to learn via a choice offering method and to learn independently. Our first hypothesis is as follows: *Students learning a foreign language on Facebook feel more autonomous than students in a face-to-face group.*

Competence: Individuals need to feel a sense of mastery through effective interaction within their environment, and to be able to deal with and control their environment (White, 1959). SDT defines competence as the need to be effective in interactions with the social environment while experiencing the opportunity to express and implement ones capacities and abilities (Deci & Ryan, 2002). Students' feelings of competence increase when they are sure that their learning activities and tasks match their knowledge and skills. Moreover, the activities students are required to perform should be both demanding and challenging in order to increase students' motivation. Tasks should also provide students an opportunity to actively respond and to receive immediate feedback (Brophy, 1981). A student who has the feeling of having control over his/her learning, will engage in more meaningful and deep learning activities and will get to higher levels of achievement (Linnebrink & Pintrich, 2002). In this way, when other students or a teacher asks different questions, students are stimulated to discuss and share their views on the causes and effects of a particular issue.

We expect Facebook to be highly influential in the improvement of feelings of competence because the context of online social networks is free from some of the problems existing in face-to-face classrooms. For example, students who dare not speak in front of others can act more readily in this environment. Moreover, students have enough time to express their standpoints and views or even to check their correctness, and thereby to more confidently act and engage among peers and classmates. The second hypothesis is: *Students learning a foreign language on Facebook feel more competent than students in a face-to-face group.*

Relatedness: Relatedness refers to a need for belonging to or depending on a certain group. Classrooms satisfy this variable through providing various opportunities of collaboration and interaction for students. Collaboration is in fact, one response to the need of relatedness in students and makes it possible for them to discuss an issue and to help and constructively criticize each other, thereby increasing their self-confidence (Kennedy, 2007).

It is obvious that one of the most important functions of online social networks is establishing communication and social interaction (Helliwell & Putnam, 2004). Communication in these networks, other than being free from time and space limitations, is possible with a variety of formats such as audio, visual, written, and short messages that are easy to use. Therefore, one may expect that the use of these networks will increase feelings of relatedness in students. The third hypothesis is thus: *Students learning a foreign*

language on Facebook feel more related to other students than do students in a face-to-face group.

2.1. Relationship with learning outcomes

We did not find any other scientific studies regarding the influence of Self Determination Theory on students' use of social networks, social media or even Web2.0; this article is likely the first on this subject. The only related study we were able to find was an unpublished article by Miller and Prior (2010) who theorized about the role of online social networks in supporting friendship behaviors. Miller and Prior argue that using online social networks fulfills individuals' basic psychological needs in terms of SDT. A few studies on e-learning as well as on using Information and Communication Technology (ICT) as the basis of Self-Determination Theory are worth mentioning here.

Brooke (2013) investigated the potential that an online Virtual Learning Environment (VLE), such as Blackboard or Moodle, can provide adults who are pursuing their learning in university settings an optimal autonomy-supportive environment for learning. Their results suggest that a VLE might lead to optimum learning through the facilitation of a state of 'flow' or 'autotelic' activity, a concept closely related to autonomy and intrinsic motivation. On the basis of Self-Determination Theory, Sørebø, Halvari, Flaata, and Kristiansen (2009) investigated teachers' motivation for using e-learning technology. Their project showed that teachers' motivation related to feelings of autonomy, relatedness and competence. Chen, Jang, and Branch (2010) also explored on-line learner motivation on the basis of the SDT model. Their study collected four categories of variables (1) Contextual support, (2) Need satisfaction, (3) Motivation, and (4) Learning outcome. Along with autonomy, competency, and relatedness, the variable "Need satisfaction" was used as an indicator. Results from structural equation model indicate that need satisfaction could predict motivation. An unexpected result of their study, however, was that motivation failed to predict learning outcomes. Yet, Deci and Ryan (2002), the authors behind Self Determination Theory, emphasize that motivation may have a direct influence on learning outcomes. A number of other experimental studies suggest that in regular classroom settings, motivation predicts learning outcomes. For example, Ehrman (1996), Ramage (1990), and Tachibana, Matsukawa, and Zhong (1996) found that there was a direct relationship between motivation and learning outcomes: the higher the motivation, the higher the learning outcomes. Therefore, the findings from Chen et al. (2010) appear to be rather unique in that none of the other studies support these findings.

We may conclude that previous research supports the hypotheses formulated above, but that the definite tests were not yet done. Given the results of previous research, the current study expects that relationships will appear between autonomy, competence, and relatedness on the one hand and learning outcomes on the other hand. The fourth hypothesis is: *Autonomy, competence and relatedness correlate with learning outcomes.*

2.2. Research questions and hypotheses

The general research question was:

How can we explain differences between a face-to-face group (FTF) and a Facebook group in terms of self-determination theory?

The main hypothesis in the present study is that Facebook is able to create an appropriate environment on the basis of autonomy, competence and relatedness. The first hypothesis is that students in the Facebook group will reach higher learning results in a foreign language than students in a face-to-face group. Then the three hypotheses described above will be tested; students in the Facebook group feel more related, competent and autonomous than students in a comparable face-to-face group. Our study also investigates the relationship of the three SDT variables with learning outcomes thereby allowing us to better understand why and how Facebook increases students' learning outcomes. The hypothesis is: Autonomy, competence and relatedness correlate with learning outcomes.

3. Method

This study is a quantitative field experiment with a pre/post-test non-randomized control group design using a Facebook group as experimental group and a traditional face-to-face group as control group.

3.1. Participants and sample

The sample consisted of Iranian PhD students, all having problems learning English well. This has to do with the fact that they tend to live with each other in their own language subculture, and continue speaking the Persian language. They have few experiences in speaking and writing English. Moreover, they generally are very shy in speaking English, which is, for them, a very difficult language to learn. Most students had disappointing experiences with courses and failed to learn English on their own. They were all living in Schengen zone countries: a group of 40 individuals, between the ages of 25 and 35, with an intermediate command of the English language were selected. These students were then divided into two groups of 20 based on the following criteria: the first group (the experimental group, which used Facebook for language learning) consisted of students living in different Schengen zone countries such as Germany, Denmark, Belgium, The Netherlands, Sweden, Norway, and France; the second group (the control group, which attended face-to-face meetings for language learning) included Iranian students living in different Dutch cities, especially Utrecht. Forty-five percent of students divided into the two groups were women while 55% were men. It is important to note that there was no random assignment to the two groups and the groups differed in the countries in which they lived. They were all from Iran and were about the same age. Possible disturbing differences between the groups in, for instance, language levels, learning abilities or motivation could be checked via measurements at the beginning of the courses.

3.2. The intervention in the Facebook group

This group was exposed to the English language for one hour a day, during one month (except for the weekends) through 20 formal on-line teaching sessions via a group page created in Facebook as well as via Skype. These sessions consisted of participating in different conversations and/or interactive activities with the male teacher (a native speaker of English) and classmates. Students had to interact and perform different assignments on the group's wall on Facebook. Each student had to write a short paragraph on a daily basis, on a specific subject, and then to post it on the group's wall. The teacher followed a teaching method described in the book used (see below). Students were permitted to use any kind of support instruments and/or educational resources available to them on the wall of the group or in their peers' posts and feedback. These support instruments and resources consisted mainly of pictures, videos, links, etc. Alongside these online interactions, students were permitted to raise various questions that dealt with the assigned activities, to which other students and/or the teacher responded. Moreover, when appropriate, students shared with others what they considered to be interesting or useful regarding the studied material.

3.3. The intervention in the control group

In this group, students participated in various activities via formal teaching of the English language in a traditional classroom for one hour and forty minutes a day (20 sessions of 1 h for teaching followed by 40 min for studying students' assignments among peers), during one month (except for the weekends). These classes were also conducted by a (different) male native English-speaking teacher. In this group, students were requested to write (typed and printed) daily short paragraphs on a specific subject; fellow students had to then give them feedback regarding their writing. The teacher supervised all in-class activities and helped when needed, leaving the majority of the discussions in the hands of students.

3.4. Teaching materials and class management

In this educational English language course, all participants in both groups used the book "*Face 2 Face*"; the two teachers also organized their lesson plans and/or activities according to this book, as much as possible, in the same ways. Each lesson from the book included four sections (A, B, C, and D). Students were to study two pre-determined sections one day before participating in class activities and/or raising questions. The teachers in both groups also selected some exercises and asked students questions about them. Moreover, when needed, teachers explained ambiguous grammar points and clarified the necessary linguistic concepts. The teachers also taught students one figure of speech per day. In general, the first part of each session was spent on conversations among students, concerning different issues, during which time students not only exchanged ideas and opinions, but also gave feedback to each other. The second section of the class was dedicated to answering students' questions, removing any remaining ambiguities and teaching important linguistic concepts. The last section was spent on speaking about students' assignments.

However, in the control group students' assignments were studied and commented on by peers during class time inside the classroom, thus the reason an extra forty minutes was added to each in-class session in addition to the specified one hour of instruction and interaction. In this group, in each class session, students were divided into groups of 4–5, in which they exchanged assignments with classmates and gave/received feedback to/from one another for twenty minutes. During the next ten minutes, they discussed the feedback given/received and the last 10 min were spent on students' questions for the teacher regarding their assignments.

3.5. Differences between the experimental and control group

Although the experimental and control group were comparable in terms of teaching content (the same chapters, assignments, tests, etc.), there were, apart from the difference in country of residence (see above) also some differences in time expenditure: in the face-to-face group students spent 40 min extra in giving and receiving feedback, whereas the Facebook students gave and received feedback in their own time. Furthermore, the teachers were different, but both native speakers and male; they were the same age and had similar teaching experience.

3.6. Research instruments

For the purposes of this quantitative field experiment, we relied on the following research instruments.

3.7. Pretest and posttest

Prior to beginning the course, as well as after the completion of the course, all participants were administered a pretest and posttest. The standardized TOEFL test was used in order to investigate students' learning levels in the beginning and to measure students' linguistic outcomes. The TOEFL test is a highly reliable English proficiency test. The test measures the ability to use and understand English at the university level; it also evaluates how well one combines listening, reading, speaking and writing skills to perform academic tasks. It consists of listening, speaking, reading and writing questions. These 4 sections have 120 (multiple choice) questions in total. The total reliability was 0.94 (Educational Testing Services., 2011). Reliability coefficients for the parts of the test were 0.85 for Reading, 0.85 for Listening, 0.88 for Speaking and 0.74 for Writing (Educational Testing Service, 2011). The scores were converted to the levels 1–5 according to the standardized procedures of TOEFL. In total, one can score 120 points on the test (30 points for reading, 30 for writing, 30 for listening and 30 for speaking). This 120-point scale is transformed into a 5-point scale by dividing by 24. The resulting 5 points form internationally recognized "levels of proficiency" 1 being a very low level and 5 the highest. A score of 2.5 for instance means an intermediate level of proficiency. Here we used the total score correct out of 120 divided by 24.

3.8. Questionnaires

All participants answered a set of questions, called the "Competence Questionnaire" before and after the course. This questionnaire, which consisted of nine items, was developed to measure students' feelings of competence when studying. Sample items included: "I don't have any idea about how to go about learning the English language" and "My English language learning aptitude is high." There were 5 possible answers: 1 = totally disagree, 2 = disagree, 3 = agree, 4 = totally agree, 0 = no comment) scale. A reliability test revealed an acceptable internal consistency (α = .79). The competence questionnaire was used for the longitudinal part of the study.

3.9. Intrinsic Motivation Inventory

The Intrinsic Motivation Inventory (IMI) is a multidimensional measurement device developed for evaluating participants' subjective experience associated with a target activity in laboratory experiments. It is easily available via the SDT website: www.sdt.com. It has been utilized in several experiments concerning intrinsic motivation and self-regulation. This questionnaire includes different sections; we selected the following three scales:

Autonomy: This scale contained seven items. Each item has been modified to fit the research context. Sample items include: "I didn't really have a choice about doing these activities" and "I did these activities because I had no choice." A reliability test on the seven items revealed good internal consistency (α = .95).
Competence: This scale contained six items. Each item has been modified to fit the research context. Sample items include: "I think I am pretty good at learning language" and "After working at this course for a while, I felt pretty competent." This competence questionnaire was used as a dependent variable after the completion of the courses. A reliability test on the six items revealed good internal consistency (α = .89).
Relatedness: The scale contains seven items. Each item has been modified to fit the research context. Sample items are "I really doubt that my classmates and I would ever be friends," and "I feel close to my classmates." A reliability test on the seven items revealed good internal consistency (α = .85).

The questionnaire was completed at the end of the courses.

3.10. Interview and observations

During the course, all students' activities were observed and recorded. As the interviews and observations are not used in the present article, further details will be presented elsewhere.

4. Results

4.1. Check on pre-existing differences between the groups

Since the groups were not randomly assigned, we needed to check whether the groups differed before the education took place. There were three kinds of data available: the TOEFL test, the competence questionnaire and demographic variables such as age, sex and discipline of the PhD students. On the TOEFL test, the means and standard deviations were $M = 2.25$, SD = 0.55 for the face-to-face group and $M = 2.08$, SD = 0.44 for the Facebook group; there was no significant difference ($t(38) = -1.11$; $p = .27$). For the competence questionnaire, the means and standard deviations at pretest time were $M = 2.51$, SD = 0.34 for the Facebook group and $M = 2.34$, SD = 0.42 for the face-to-face group; this difference is also not significant ($t(38) = 1.36$; $p = 0.18$). Furthermore, there were no differences in the number of men and female in the two groups: 9 men and 11 women in the face-to-face group and 11 men and 9 women in the Facebook group (Chi square = 1.76; n.s.). There was also no significant difference in age (Chi square = 0.40; n.s.): the ages of the participants in the Facebook group included 11 students between 25 and 30 years old and 9 students between 30 and 35 years old and those in the face-to-face group included 15 students between 25 and 30 and 5 students between 30 and 35.

4.2. Differences between the groups in terms of learning outcomes

The purpose of the first hypothesis test is to show that there was a difference between the two groups after the courses and that the Facebook group learned more than the students in the face-to-face group. In a repeated measures design, the effects of group, Time and Time * group interaction were calculated (see Table 1).

As Tables 1 and 2 show, all three effects tested were significant: There were significant effects of Group, Time and the interaction of Group * Time. The group effect ($F(1,38) = 6.90$) means that the Facebook group scored higher in general. At pretest the difference was minimal ($M = 2.08$ (SD 0.44) versus $M = 2.25$ (SD 0.55)) and at posttest the scores were significantly higher ($M = 3.28$ (SD 0.30) versus $M = 2.45$ (SD 0.51). The time main effect ($F(1,38) = 9.80$) means that both the means were higher after the courses than before ($M = 2.08$ and $M = 2.25$ versus $M = 3.08$ and $M = 2.45$). The significant interaction effect ($F(1,38) = 5.00$) shows that the students in the Facebook group ($M = 2.08$ to $M = 3.28$) learned more than the students in the face-to-face group ($M = 2.25$ to $M = 2.45$).

Table 1
Repeated measures results for learning outcomes.

	Sum of squares	df	Mean square	F	Sig.
Between-subjects					
Intercept	505.01	1	505.01	1650.79	.00
Group	2.11	1	2.11	6.90	.01
Error	11.63	38	.31		
Within-subjects					
Time	9.80	1	9.80	83.69	.00
Time * group	5.00	1	5.00	42.70	.00
Error (time)	4.45	38	.12		

Table 2
Mean (& SD) of learning outcomes per group.

Testing time	Learning outcomes	
	Face to face group	Facebook group
Time 1 (pretest)		
Mean	2.08	2.25
SD	(0.44)	(0.55)
Time 2 (posttest)		
Mean	3.28	2.45
SD	(0.30)	(0.51)

4.3. Facebook versus face-to-face as independent variable and autonomy, competence and relatedness as dependent variables

We used independent sample *t*-tests, to compare the two groups in terms of their degree of autonomy, relatedness and competence. The results of the *t*-tests as presented in Table 3 show that there were significant differences between the two groups for all three variables.

For relatedness, the means and standard deviations for the Facebook group were 3.45 (SD 0.28); for autonomy, the mean was 3.74 (SD = 0.35) and for competence, they were 3.59 (SD = 0.32). For the face-to-face group the means and standard deviations were $M = 2.45$ (SD = 0.36) for relatedness, $M = 2.87$ (SD = 0.52) for autonomy and $M = 2.82$ (SD = 0.35) for competence. The mean values calculated for the three variables after the courses were higher after the Facebook lessons than after the face-to-face instruction. The corresponding *t*-values were 9.83, 6.14 and 7.27 respectively. All three *t*-tests were significant. The *d*-values (effect size; see Table 1) were the highest for relatedness ($d = 3.10$). The second highest effect size was for competence ($d = 2.30$). The effect size for autonomy was the lowest ($d = 1.96$), but still considerably high.

4.4. Correlations between autonomy, competence and relatedness with learning outcomes in the Facebook and face-to-face groups

Table 4 presents the correlations between the three self-determination variables and the learning outcomes by group, as well as for the combined sample. For the combined groups, all correlations were statistically significant and ranged from 0.60 to 0.68. Within the two groups, however, there were no significant correlations. Only the correlation of learning outcomes and feelings of competence in the Facebook group ($r = .44$; $p = .05$) approached significance.

In a regression analysis (Stepwise) (see Table 5), 49% of the variance could be explained. Relatedness proved to be the strongest predictor of learning outcomes, followed by competence. Autonomy did not explain any remaining variance in learning outcomes (the remaining partial correlation was 0.14). In the next regression analysis (Table 6), group (Facebook versus face-to-face) was also entered into the analysis; the total amount of explained variance was 52% and group was the only variable remaining. The partial correlations for competence, relatedness and autonomy were .17, .07, and .12 respectively. The differences in learning results were fully attributable to the treatment, which may have influenced

Table 3
T-tests for differences between the groups in relatedness, autonomy and motivation.

	Facebook group		Face-to-face group					
	M	SD	*M*	SD	*t*	Df	*p*	*d*
Relatedness	3.45	0.28	2.45	0.36	9.83	38	.00	3.10
Autonomy	3.74	0.35	2.87	0.52	6.14	38	.00	1.96
Competence	3.59	0.32	2.82	0.35	7.27	38	.00	2.30

Table 4
Correlations between autonomy, relatedness and competence with learning outcomes.

Group		Autonomy		Relatedness		Competence	
		Correlation	Sig.	Correlation	Sig.	Correlation	Sig.
Whole group		0.60	0.00	0.68	0.00	0.68	0.00
Separately by group	Facebook	0.05	0.84	0.11	0.64	0.44	0.05
	Face-to-face	0.11	0.65	−0.01	0.98	0.07	0.78

feelings of relatedness, and competence. Autonomy was less important than relatedness and competence.

5. Discussion

5.1. Hypothesis testing

In the current study we analyzed the difference between learning English via Facebook and via a face-to-face classroom in terms of the Self-Determination Theory: competence, autonomy and relatedness. As predicted, the Facebook group reached higher learning results than the face-to-face group. Thus, the first hypothesis was supported. We also conclude that all three SDT variables (autonomy, competence and relatedness) had higher scores in the Facebook group than in the face-to-face group. Thus, the three related hypotheses were also supported by the data. The greatest effect size was for relatedness, followed by competence. However, autonomy, although having the lowest effect size, still made a considerable, significant difference. For the combined groups there were significant correlations of the three variables with learning outcomes, supporting the hypothesis that there would be a significant correlation. Within the groups, there were, however, no significant correlations with learning outcomes. The results for our last hypothesis were also quite remarkable. There were clear correlations between the SDT variables and learning outcomes for the whole group, but not within the separate groups. This can be interpreted as further support for the differential influences of the learning environments, because the differences between the groups were much more influential than what happened within the groups.

Therefore, the differences between the groups in learning outcomes were attributable to the treatment, which also had an influence on the self-determination variables. Self-Determination Theory, we may conclude, explains the differences in learning effectiveness quite well, especially the feeling of relatedness and competence. Learning a foreign language via Facebook helped our Iranian PhD students learn English better than the face-to-face environment because these students felt more autonomous, competent and related to other students.

Another important outcome of our study is that from among the three basic factors of relatedness, autonomy and competence, the variable of relatedness was found to be the strongest predictor of differences in learning outcomes.

5.2. Theoretical contributions

We now interpret the effects of the three SDT variables theoretically and relate these to other studies. Relatedness can be explained as follows: first, communication and social interaction

Table 5
Regression analysis: autonomy, relatedness and competence predicting learning outcomes.

Variable	*B*	Standard error	Beta	*t*	Significance
Constant	1.04	.36	.64	.93	.36
Relatedness	.38	.15	.40	2.53	.02
Competence	.42	.18	.40	2.36	.02

Table 6
Regression analysis with group (Facebook versus face-to-face) and autonomy, relatedness and competence as predictors of learning outcomes.

Variable	*B*	Standard error	Beta	*t*	Significance
Constant	4.10	.20	.20	20.32	.00
Group	−0.83	.13	.13	−6.46	.00

are the most important functions of social networks; these networks provide users with communication with special features, free from time and space. Contrary to face-to-face classrooms in which both students and teachers require a specified time and space for communication, online interaction and communication take place as readily as possible in various forms such as audio, visual, writing and short messages. Second, communication is a key element in learning foreign languages because of the access to native speakers of the target language; access that grants users privileges such as easy and quick authentic communication and interaction. Blattner and Fiori (2009) argued that previous research has claimed that communication through technology, whether it is synchronous or asynchronous, increases motivation and learning in that it transforms coursework by expanding the intended audience and the range of communicative purposes. The authors placed a new emphasis on concise communication for an expanded readership in an environment that is conducive to development, constructive reflection, and analysis in a dynamic interface either in delayed- or real- time. The results by Shi, Cristea, Hadzidedic, and Dervishalidovic (2014) clearly show that social e-learning environments on which these strategies are applied, followed by a user case study, increased learners' perceived intrinsic motivation. Mazer, Murphy, and Simmonds (2007) noted that through access and interaction in social networks, students can more easily discover the interests they share with other students as well as with teachers, which can lead to an easier and more efficient communication between the two parties. Cho and Cho (2013) showed that the experimental group who used Twitter or other social networks for learning developed a significant amount of self-regulated learning (SRL s) kills such as planning and reflecting compared to those individuals in the control group. Moreover, O'Sullivan, Hunt and Lippert (2004) discovered that students who had access to teacher websites containing self-disclosed information were more motivated for communication and learning.

These findings highlight that online social networks have the potential to increase the degree of relatedness for foreign language learning and eventually create a community of learners (Blattner & Fiori 2009). This fact is supported by current research observations, since the majority of participants in the Facebook group continued to communicate and interact with each other even several months after the completion of the course through the webpage created in Facebook. Moynihan and Pandey (2007, p. 205) emphasized from a different perspective that an "intra-organizational social network is characterized by good relations and a sense of obligation toward other staff." This indicates that a social network approach centers on the significance of interpersonal relationships in organizational conduct. Therefore, according to the above studies, the finding that relatedness is the strongest predictor in the current research is understandable.

As for feelings of competence, based on Self-Determination Theory, there are two important matters concerning this variable: effective communication and interaction, and control over the environment. As mentioned above, communication and interaction are the two foundations and building blocks of any social network; communication and interactions within these networks are usually purposeful and effective, that is, students can interact with their peers, teachers or any scientific reference on a continuous basis and free from any (imposed) limitations. Meanwhile, within this online setting, students can ask questions, answer their peers' questions and at the same time give/receive feedback. In fact, peer feedback in online interactions may clearly be observed in the form of discussions, writing, pictures, liking and disliking in the social network Facebook, etc. Feedback has interesting characteristics within the environment of social networks, for example it is always possible to have access to feedback given by others, to use the feedback more frequently and the feedback can be referred to repeatedly. It is also possible to give feedback to others more confidently by accessing and using search engines and online documentation.

There is much discussion about the importance and features of feedback in the social network environment. However, an important remark concerning feedback and its influence on competence is the fact that, according to Deci et al. (1991), various studies on competence (Blanck, Reis, & Jackson, 1984; Harackiewicz & Larson, 1986; Vallerand, 1983) indicate that feedback is one of the central influential factors in the increase of feelings of competence. Deci et al. (1991) also emphasize that positive feedback is rather prominent in increasing feelings of competence. In other words, online social networks increase students' participation, which in turn influences competence through different learning activities such as questioning and responding as well as giving and receiving constructive feedback. Furthermore, communication barriers and problems that impede effective learning, which one may encounter in face-to-face relations are not present or rather, they are insignificant in the environment of these networks. For example, online interaction usually eliminates or reduces face-to-face affective problems such as students' shyness or lack of self-esteem. As a result, students might act more freely and more vigorously in cyberspace than in traditional classrooms. In addition, in cyberspace, there are no time constraints for asking/answering questions or discussing learning materials. Because of these privileges, students continuously improve their communication skills and enhance their self-confidence since, while having a more individualized time and process for learning, the easy access to various scientific resources available online also grants students a chance to state their views with more certainty. Finally, given the fact that these networks are rather user friendly, students usually gain control over the environment in which they are working by adjusting the settings to their preferences; this allows them to define the level of their relations, separate their private realm, and take control of their numerous interactions and communications with others. Consequently, it seems that online social networks can positively influence the two important elements of competence, effective interaction and controlling the environment.

Autonomy, being the weakest but still important predictor of the differences between the two groups, relates to the fact that students should have a choice not only in the time spent on performing academic tasks and learning activities but also in the way in which each task/activity should be performed. A closer look at the features of online social networks, that were supported by our qualitative data (video-observations, logfiles and interviews) explains the differences between face-to-face classrooms and the classes conducted in an online social network environment. Online social networks are free from time and space constraints and limitations as they may be accessed at any time, day or night; it is thus up to students to select, based on their conditions, a convenient time for doing the assigned homework and/or executing other learning activities. Because of easy access to the internet, students also have a choice in the way in which they prefer to complete their homework and learning activities, which grants them various search motors, e-books, articles, videos, etc. It is possible for them to search different subjects of their interest. Access to the Internet also allows students to easily contact their classmates and peers both within their institution and in other institutions/classes in order to perform their work as well as possible. In addition, students can use various forms of support, such as videos, pictures, and links for enhancing their work. Access to most of these resources and opportunities is impossible or very difficult in traditional classrooms, especially given the resource constraints that many institutions have to deal with due to financial problems. Therefore, it seems that developing autonomy is easier and simpler through online social networks.

5.3. Practical relevance

The present results have important consequences for practices of foreign language learning. Teaching a foreign language course on Facebook can have important effects on learning, because students can conquer their shyness, start to learn together with other students, gradually feeling more competent. Finally, they will profit more from the freedom given by Facebook to make their own choices and choose their own time and ways of learning. The vicious circle of failing to learn because one is not experiencing and practicing can be broken by opening up the space for independent collaborative and further learning.

5.4. Limitations and further research

One might wonder whether the differences found between the Facebook and the face-to-face group should not be attributed to other differences between the groups. To this end, we can rule out several alternative explanations. There were no differences between the groups in prior learning, feelings of competence, sex, or age. Two alternative explanations could not be ruled out, however. One alternative explanation could be that the teacher in the Facebook group was better than the one in the face-to-face group. We found no indications in the evaluations, the logfiles nor the observations, however, that this was the case. Finally, an alternative explanation could be that the composition of the groups made a difference. Although all participants came from Iran, the people in the Facebook group lived and studied in different countries of Europe, whereas the participants in the face-to-face group all lived and studied in the Netherlands. We could not think of any reason, however, why Iranian students living in different European countries would learn English better than Iranian students living in the Netherlands. Thus, we conclude that the differences found can be attributed to the differences between the two learning environments. We cannot be completely sure, however, that the differences in autonomy, and relatedness found after the courses were not already present beforehand. For the difference in subjective competence, there is the check for different subjective competencies at pre-test, for autonomy and relatedness, we did no have this check. Since we found meaningful relationships with learning results, and did not find any differences between the two groups before the courses, we consider this alternative explanation to be highly improbable.

This research is carried out on a small scale using a limited sample. Therefore, further research is needed with larger samples in order to present more representative data and thus stronger conclusions. In addition, the current research dealt with learning the English language; future research may be carried out on other

languages or other learning subjects in different domains of study. Furthermore, this study selected Facebook from among several different online social networks because of its high popularity among social network users. More research might be conducted on other online social networks such as Twitter and Linked-in in order to compare the results obtained in this study with students' performances and learning via other social networks. The current study had a brief look at feedback features in social networks; we propose that further research should be carried out on feedback and peer feedback in the environment of online social networks in order to further investigate the role and significance of constructive feedback on effective learning. The results of the current study indicate that the degree of competence in the experimental group (and in the control group) has increased; further research should be carried out to examine the more detailed explanation of this observation and analyze the influence of learning environments on increasing feelings of competence. More research should also be carried out on how online social networks can be combined with traditional classrooms and how this may influence outcomes concerning the three main factors of Self-Determination Theory.

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