L’apprentissage en ligne optimisé par les médias sociaux

Résumé :
Les êtres humains sont dotés d'un système de neurones miroirs (SNM) qui leur permet de faire l'expérience interne d'une action observée. Ce SNM a mis à profit les capacités d'apprentissage de l'homme. Parallèlement, la « théorie de l'esprit » (TE) explique comment les neurones miroirs se déchargent en réponse à l'observation d'actions liées à des objectifs. Puisque les individus sont dotés d’une TE de niveau supérieur, ils peuvent attribuer des états mentaux aux actions de soi et des autres. Ce papier s’appuie sur les concepts de SNM et de TE pour expliquer le rôle des médias sociaux dans l’apprentissage en ligne. Il est suggéré que les sites d’apprentissage en ligne puissent adopter certaines des fonctionnalités des médias sociaux pour créer un apprentissage en ligne au niveau de la population. Les résultats suggèrent que suivant le contenu créé par les camarades de classe, ils peuvent tirer parti de l’apprentissage social et à leur tour, renforcer leur efficacité personnelle. La motivation pour le divertissement encourage à la fois l'affichage de contenu dans les groupes de réseaux sociaux et le suivi du contenu créé par les autres camarades de classe.

Mots clés :
Média Sociaux, Neurones Miroirs, Théorie de l’Esprit, Mentalisation, Eudaimonisme

Abstract:
Human beings are endowed with a mirror neuron system (MNS) that enables them to internally experience any observed action. This MNS has leveraged the learning capabilities of humans. “Theory of mind” (TOM) explains how mirror neurons discharge in response to observing goal-related actions. Being endowed with higher-level TOM, people can ascribe mental states to the actions of self and others. This paper relies on the concepts of MNS and TOM to explain the role of social media (SM) in leveraging the efficacy of educational and training courses. Based on the concept of social learning stimulated by the interactions in social media groups, a model is suggested and tested. The results suggest that following the contents created by classmates, leverages social learning and in turn, course self-efficacy. Entertainment motivation encourages both posting contents in the SM groups and following the contents created by other classmates. This research has implications for managers and people in charge of learning institutes, MOOCs and e-learning sites.

Keywords:
Social Media, Mirror Neuron System, Theory of mind, Mentalization, Eudaimonism
1. Introduction

The advent of social media (SM) has raised opportunities for humans to interact and learn from one another. “Social learning” refers to the capacity of human beings to imitate the effective behaviors of their peers, coordinate their actions in groups and adjust their behaviors by observing other members of the group (Molleman and Gachter, 2018). The ability of humans to learn from one another through social learning can create a “cumulative cultural evolution of new adaptations” that outpaces organic evolution (Richerson and Boyd, 2005, pp.12-13). Unlike organic evolution, in which small variations and learned behaviors gradually accumulate (ibid p.49), social learning enables individuals to adopt technologies and behaviors because other group members use those technologies or engage in those behaviors. Thus, the whole community can adapt in a way that outreaches any individual mastermind learner (ibid p.13). The term “social media” refers to “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (Kaplan and Haenlein, 2010, p.61). This definition encompasses various platforms that enable a large number of users to create and share content and interact with one another (Mention et al., 2019). Social Networking Sites (SNS) such as Facebook and instant messaging applications like WhatsApp and Telegram are famous examples of social media (Karapanos, 2016). Social media enable learners to create learning communities and learn from one another. It allows users to generate and share knowledge with community members (Guerin et al., 2018). Since SM provides individuals with opportunities to interact and build relationships it allows for a new culture of learning, wherein users learn through interactions (Yang et al., 2014). The collaborative learning phenomenon permits learners to interactively cooperate in the learning processes and encourage learning through interpersonal communications and knowledge sharing (Al-Rahmi et al., 2018; Al-Rahmi and Zeki, 2017; Molinillo et al., 2018).

Offline courses that focus on textbooks and traditional methods of learning and treat students as passive receivers of knowledge may suffer from a low learning efficacy because they merely rely on the knowledge and expertise that the teacher can bring to the course (Sun et al., 2014). On the other hand, the majority of e-learners who participate in Massive Open Online Courses (MOOCs) leave the courses unfinished (Acquatella, Fernandez and Thomas, 2019), even though MOOCs allow students to attend the lectures of high-profile professors irrespective of time and place (Jung and Lee, 2018). Giddens argues that e-learning deprives participants from the rich interactive environments of offline classes (2006, p.732). Such deprivation can lower the effectiveness of the course as well as the motivation to complete it. The interaction opportunities provided by social media can address the efficacy gap, caused by the downward direction of information flow. Callaghan and Bower argue that rather than a simple communicational tool, social media are services, providing users with the opportunities to interact and communicate information with one another (2012). Thus, online skills of the students can be used to leverage course effectiveness through social learning, and to address the efficacy gap.

Although scholars (e.g., Callaghan and Bower, 2012; Al-Rahmi and Zeki, 2017; Molinillo et al., 2018) have addressed the potentials of social media for improving learning experiences, factors affecting the use of interactive online spaces and the means of promoting collaborative and interactive learning are understudied (Al-Rahmi et al., 2018). This paper investigates the engagement of learners in course-related SM groups and how learners’ engagement impact social learning and course self-efficacy. The literature on social media and social learning, mainly used
in psychology, is reviewed before defining the hypotheses. The paper then presents a conceptual model that leads to the methodology section, followed by data collection and research findings, and is ended by the discussion and conclusion.

2. Theoretical Background and literature review

2.1. Motivation to use SM groups and learning efficacy

If not satisfying new needs, new media have the potential to satisfy current needs of the users in new ways (Krishnatray et al., 2009). Usage and Gratification Theory (UGT), originating from the field of socio-psychology (West et al.2007), is an approach to explain the choices people make about media consumption (Krishnatray et al., 2009). This approach posits that what motivates people to use SM platforms, is the urge to satisfy their psychological and social needs (Dhir et al., 2016). Social media allow users to interact online with one another and create content that is followed and observed by others (Hogan,2010). SNS such as Facebook and Instagram allow users to share selfies and self-revealing information to a massive number of audience. Since revealing such information allows users to construct their social self and nourish their ego, some scholars suggest that a narcissistic personality trait motivates users to create content in SNS (Hawk et al.,2019). Online groups and communities, on the other hand, allow members to address a limited, particular group of people with relevant content (Hogan, 2010), to share knowledge and behave as knowledgeable experts (Miller,1995).

Some scholars argue that entertainment is among the primary motivations of SM usage (Dhir et al., 2017; Gan, 2016; Besley, 2008). SM usage entails the active participation of users in the form of creating and sharing content and following the contents created by other members. Without the content generated by members, there would be nothing to follow or share. Specialists define active participation as engaging in “mutual exchange of information and knowledge” in online communities (Ma et al.2018). In order to encourage participants to engage in online communities; practitioners apply lessons learned from gaming spheres in non-gaming online spaces. For example, they might introduce a challenge into an online community by asking the members to suggest an idea, design or a name for a new product. They might then select the winning ideas or designs and reward them. The presumption is the enjoyment and challenge of gaming features motivate members to involve in creation and following the contents (Leclercq et al., 2018; Leclercq et al., 2017). The enjoyment and curiosity, drive users to engage in content creation and to observe the contents created by other members (Leclercq et al., 2018). Enjoyment has found to be a determining factor in SM usage (Kang and Schuett, 2017 ). Scholars in positive psychology have introduced a complex dimension of enjoyment that is far from providing pure fun: eudaimonism. Rather than immediate pleasure, eudaimonic enjoyment derives from actualizing an individual’s best potentials and applying those potentials to fulfill his/her goals (Waterman et al.2010). Individuals that are motivated by eudaimonic enjoyment tend to enjoy engaging in activities that help them realize their potential and find meaning in life. Providing users with opportunities to learn and grow, SM can be a source of eudaimonic enjoyment (Odağ et al., 2018). Thereupon, this paper postulates that when learners join online groups in SM with their classmates, the eudaimonic form of motivation increases their active participation:
H1: Eudaimonism positively affects creating content on course-related SM groups

H2: Eudaimonism positively affects following the contents created by other members on course-related SM groups.

Motivation to use SM can encourage learners to engage in the course-related SM groups. This engagement, in turn, affects the students’ perception about their capabilities. Hillman (2017) defines Course self-efficacy as “one’s confidence in their ability to succeed academically.” Han and Ellis present the idea of blended learning in which the learners engage in online discussions with classmates and the teaching staff. They posit that online discussions of learners will extend face-to-face discussions that might take place in class settings. The asynchronous nature of online discussions enables learners to “think, reflect and critically engage with the topics” (2019). Previous research findings show that active participation in course-related SM groups invokes active learning that translates into the efficacy of related offline courses. Active learning is “anything that involves students doing things and thinking about the things they are doing” (Dougherty and Andercheck, 2014). Skrypnyk et al. (2014) argue that social interactions that take place in SM have the potential to increase the effectiveness of e-learning. SM websites provide users with spaces to discuss learning-related issues. Therefore, this paper proposes that learners who engage in content creation in the course-related groups created on SM (i.e., WhatsApp, Telegram Facebook, and so on.), and discuss their course-related issues, enjoy a better course self-efficacy:

H3: Active content creation in SM groups positively affects the course self-efficacy

2.2. Mirroring theories and the game of influence

Members of a group, mirror the behaviors of one another through their interactions, to the extent that one can call a group “a hall of mirrors” wherein everyone in the group mirrors the behaviors of other members (Birchmore, 2015). Cooperative settings increase the tendencies toward mirroring others (LaFrance, 1985; Van Swol, 2003). Van Baaren et al. contend that imitation benefits to everyone in a group. Because not only can the imitators learn from the more prominent members of the group, but also the rest of the group members benefit from the imitation phenomenon. Because the person who is the subject of imitation takes a more positive behavioral orientation towards all the members of the group (2004). People like to be mimicked by others. They construe other’s imitation as a kind of compliment (White et al., 2011) When some members of a group mirror the behaviors of another individual; the individual whose behavior has influenced others tends to interpret the imitators’ behaviors more positively and persuasive (LaFrance, 1985). People tend to mimic the behaviors of the group members toward which they have a positive attitude (LaFrance, 1985). In the process of social learning, a large number of people can apply solutions learned from more advanced or more creative individuals to cope with environmental demands (Richerson and Boyd, 2005, pp.12-13). Social learning theories suggest two imitating strategies. Learners either imitate the behaviors of successful and influential peers or they imitate
locally common behaviors. Members of the group mutually benefit from coordinating their behaviors to one another (Molleman and Guchter, 2018).

A set of neurons in the brain called “mirror neuron system” supports learning by imitation. (Rizzolatti and Craighero, 2004). Neuropsychologists first discovered mirror neurons in macaque brains. A set of neurons in PFG, AIP, and F5 areas of the monkey’s brain (see Figure 1), discharge both when the monkey executes an action (e.g., grasping or eating a nut) and when it observes another individual executing the similar action (Rizzolatti & Fabbri-Destro, 2010). Thus, scientists named them “mirror neurons,” that means neurons that mirror the behaviors of an observed individual as though the observer is performing it. Follow up studies showed that the brain of some other animals, birds and also humans have mirror neurons (Giret et al., 2017). The studies have shown that in humans, the homolog of the monkey’s area F5 activates when an individual observes another person executing an action (Rizzolatti and Craighero, 2004; Hickok, 2014).

![Figure 1: Mirror neurons in humans, macaques (Giret et al., 2017)](image)

Experiments with macaques have shown that mirror neurons can predict the intention of the individual they are observing (Rizzolatti et al., 1996; Hickock, 2014). Human beings also can surpass scattered facts to find out what is going on beyond the scenes. The ability of humans to discover the intention of observed behavior is termed “Theory of Mind.” Theory of mind - or “mentalizing capacity” - refers to the ability of individuals to represent the mental state of their own or another individual, to ascribe mental states such as intentions, dispositions, and beliefs to self and others (Espinós et al., 2018).

As social media is all about online content sharing, it allows users to disclose and express themselves and experience online social presence. The online social presence creates an environment in which users influence each other’s behaviors (Kaplan and Haenlein, 2010). Hence, this paper hypothesizes that those students who observe the contents of their classmates in the course-related SM groups will enjoy higher social learning:

H4: Following the contents created by other members in course-related SM groups, positively affects social learning.

Since individuals in course-related SM are in long-term exposure to one another’s online behavior, they can decode and imitate the behaviors of their successful peers (Molleman and Gächter, 2018). Relying on theories of mirroring supported by neuropsychological foundations, the present paper hypothesizes that social learning, facilitated by course-related SM groups, has the potential to leverage course self-efficacy:
H5: Social learning positively affects course self-efficacy

In the context of SM that revolves around connecting people, many users are interested in the fame that they can obtain through online interaction. The fame that can lead to cultural capital and recognition, in turn, encourages users to engage in prestigious content creation activities that promise to become famous (Kamis et al., 2017). People are more likely to imitate the actions of more prestigious characters than lower-ranked members of the group. (Richerson and Boyd, 2005, p24). Hence, this paper hypothesizes that through social learning, members in a course-related SM group imitate their fellow learners’ content creation act:

H6: Social learning positively affects active content creation on social media groups

3. The conceptual model of the research

Based on the five discussed hypotheses, the theoretical model of the research is proposed (See Figure 2). Appendix A) presents the scales for measuring the variables:

![Figure 2: Theoretical model of the research](image)

4. Methodology

5.1. Data collection and sampling

Data for testing the model is collected through an online questionnaire based on a landing page, to facilitate the sharing on SM and maximizing the response rate. The landing page provided the respondents with a brief instruction on how the questionnaire needed to be filled out. Descriptions about an incentive for answering the questionnaire, equal to USD30 rewarded to a participant randomly chosen from all the respondents, and clarification for anonymity were available on the landing page. Instruction on scales appeared on the top of each section. The researchers approached the participants with three methods. First, the researchers posted an invitation for participating in the research that included a link to the online questionnaire in the WhatsApp and Telegram groups of the classroom supervised by the researchers. Channels of four universities, namely: the
University of Isfahan, two branches of Payamnoor university\(^1\), Hashtbehesht Higher Education Institute, and two educational institutions with online and blended courses, namely Sobhan Institute\(^2\) and Idea school\(^3\), also served to post the campaign’s invitation to participate. Second, the researchers asked their colleagues who communicated with their students electronically, if they could send the link to the SM groups and channels in which their students are active. Most of the time, they answered positively, except one who did not. Because he believed his students, coming from a low social class with a very low-income level, did not use smartphones for learning-related purposes. Third, the researchers placed the link to the questionnaire in the SM groups of online communities in which the students of one major, either in biology, business or physics, interacted and shared knowledge.

Approximately 1400 potential Persian respondents clicked the link to the questionnaire. From which 330 respondents completed and submitted the questionnaire during one month. More than half of the respondents (51\%) are female; 50.5\% aged 18-25 years old, about 30\% are 25-34 years old and about 17\% age 35-44 years old. Less than half of the respondents (45.5\%) have a bachelor's degree, and 32.5\% have a master’s degree. More than 40\% of the respondents are university students, and about 16\% are office workers. Approximately 66\% of respondents participate in online courses or communicate with their professors through SM. 10\% of the respondents participate in private online classes, 11\% participate in open platforms like “Maktabkhooneh\(^4\),” “Sololearn\(^5\),” “Udemi\(^6\),” “Faradars\(^7\),” “Coursera\(^8\),” “Go-to-class\(^9\),” “Faranesh\(^1\),” “Edx\(^1\)” or customized platforms ran by institutions\(^1\). More than 93\% of the respondents declared that they actively interacted with their classmates in the SM platforms.

The scales developed by Hillman (2016), Peralta & Steele (2010), Hu et al. (2015) and Waterman et al. (2010) are used to develop the questions and measurement of this paper with some modifications to adapt them to the current research purposes (See Appendix 1). A 5-point Likert scale is used to measure the data, that starts from « Completely disagree » (1) to « Completely agree » (5).

5. Results

The present study uses two-step structural equational modeling with the use of AMOS 24 software to analyze the data. SPSS software is used to analyze the data for multivariate normality, multicollinearity, and positive definiteness. The collinearity statistics do not show any tolerance

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\(^1\) Pnu.ac.ir
\(^2\) online.sobhan.institute/
\(^3\) Ideaschool.ir
\(^4\) maktabkhooneh.org/
\(^5\) sololearn.com/
\(^6\) www.udemy.com
\(^7\) Faradars.org
\(^8\) Coursera.org
\(^9\) Gotoclass.ir
\(^1\) Faranesh.com
\(^1\) Edx.org
\(^1\) Such as: “lms.ui.ac.ir” or “lms.pnu.ac.ir”
less than .01 or any VIF higher than 10, proving that data does not violate the assumption of collinearity. The determinant of the correlation matrix is 1.79, satisfying the positive definiteness condition. After analyzing the 330 data for Mahalanobis distance, 24 responses were recognized as outliers and were eliminated from the analysis, leaving the research data with 306 responses, satisfying the condition of multivariate normality. Principal component factor analysis confirms the validity of the constructs and shows that the sample meets the threshold of sample adequacy with an overall KMO of 0.897, Bartlett's test of sphericity = 4595.507, and P<0.001 (Verhagen et al., 2017). The first five eigenvalues are higher than one and then drop to 0.7 for the sixth eigenvalue, proving that the data represent five different constructs. The Cronbach alphas of all the first-order latent variables range from .821 to .937, all higher than the lower acceptable level of 0.7, confirming the internal reliability of each scale.

5.2. Measurement model analysis
The measurement model, containing five latent variables is analyzed to measure convergent and discriminant validity. The composite reliability (CR) of all the first-order constructs range from 0.787 to 0.951, and the average variance extracted (AVE) of all first-order variables except one (0.480 for “course self-efficacy”) exceed the recommended 0.5. As the AVE of this construct is close to the lower acceptable level and the respected CR is higher than 0.6, (CR=0.846). The convergent validity of the construct is adequate (Fornel and Larcker, 1981). The confirmatory factor analysis shows a good fit, with $\chi^2$/df = 1.524, CFI=0.970, GFI=0.913, TLI= 0.964, RMR=0.059, RMSEA=0.041. The constructs of the model were evaluated for discriminant validity, comparing the correlations and squared root of AVE scores for each of the pairwise constructs (Table 1). As none of the correlations exceed the squared root of AVE for each pairwise constructs, discriminant validity is confirmed, indicating that the constructs measure different concepts. Thus Forner and Larcker (1981)’s criteria of discriminant validity are satisfied.

<table>
<thead>
<tr>
<th>Construct</th>
<th>AVE</th>
<th>CR</th>
<th>efficacy</th>
<th>So. learn.</th>
<th>follow</th>
<th>creat.</th>
<th>eudaim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficacy</td>
<td>0.480</td>
<td>0.846</td>
<td>0.692</td>
<td></td>
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<tr>
<td>Social learning</td>
<td>0.578</td>
<td>0.843</td>
<td>0.39</td>
<td>0.760</td>
<td></td>
<td></td>
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<tr>
<td>Following</td>
<td>0.545</td>
<td>0.825</td>
<td>0.458</td>
<td>0.48</td>
<td>0.738</td>
<td></td>
<td></td>
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<tr>
<td>Creating</td>
<td>0.582</td>
<td>0.872</td>
<td>0.344</td>
<td>0.371</td>
<td>0.561</td>
<td>0.762</td>
<td></td>
</tr>
<tr>
<td>Eudaimonic</td>
<td>0.701</td>
<td>0.921</td>
<td>0.421</td>
<td>0.308</td>
<td>0.464</td>
<td>0.515</td>
<td>0.837</td>
</tr>
</tbody>
</table>

Table 1: Indicators of discriminant validity of the constructs

5.2. Structural model analysis
Variance analysis for the sample size of 306 for the initial model except for $\chi^2$ ($\chi^2$ = 382.665 P<0.001) has a good model fit with $\chi^2$/df = 1.628, with a GFI of 0.907, TLI=0.957, RMR= 0.09, CFI=.964 and a good RMSEA of 0.045. Table 2 summarizes the results:
The effect of “following the content” on “social learning” is the highest (β=0.530, P<0.001) followed by the effect of “eudaimonism” on “following the content” (β=0.486, P<0.001). “Eudaimonism” also significantly affects “content creation” (β=0.457, P<0.001). “Social learning” positively affects “content creation” (β=0.248, P<0.001). Whereas “social learning” strongly affects course self-efficacy (β=0.327, P<0.001), content creation has a slightly less but still strong effect (β=0.243, P<0.001) on course self-efficacy. In order to examine the indirect effects, SEM bootstrap test of indirect effects, with a bias-corrected bootstrap confidence interval of 0.95 is performed using AMOS software. This test has been proven to be a valid examination of mediating effects (Pelet et al., 2017). The results show that the standardized indirect effect of eudaimonism on social learning is 0.257. The indirect effect of eudaimonism on course self-efficacy is 0.211. Following the content indirectly impacts course self-efficacy (β=0.205). Social learning has a minor indirect effect (β=0.06) on course efficacy.

**Figure 3: Theoretical model of the research with factor loadings**
The research model and its confirmed relationships suggest that eudaimonic motivation of the users for interacting in course-related SM groups indirectly leverages the course self-efficacy. Eudaimonism, or the urge one feels to actualize his/her potentials in order to fulfill a higher purpose in life, leads to active engagement in the course-related SM groups. The findings show that learners who are driven by a eudaimonic motivation to participate in such SM groups are more likely to engage in content co-creation and follow the content created by their classmates. Both “following the content of classmates” and “content creation” lead to higher “course self-efficacy.” Whereas “content creation” directly and significantly affects course self-efficacy (β=0.24, P<0.001), “following the contents of other classmates,” indirectly affects course “self-efficacy” (β=0.205) through social learning. Social learning also positively affects “content creation” in the SM group. Hence, observing other members of the group who create content in the course-related SM group affects content creation positively. The indirect effects of social learning on course efficacy is not considerable (β=0.06). Therefore, content creation inspired by social learning does not affect course self-efficacy considerably.

Results of this research are in line with prior neuropsychology research (e.g., Rizzolatti and Craighero, 2004) and SM usage (e.g., Dougherty and Andercheck). Neuropsychological (e.g., Whiten, 2011; Whiten and Waal, 2017) studies prove that the mirror neuron system has a role in imitating and emulating behaviors. Research in psychology and social science (e.g., Birchmore, 2015; Van Swol, 2003; Richerson and Boyd, 2005) have also shown that people tend to mirror and learn from their in-group peers and those with which they have a cooperative interaction. The results of this study validate a significant and robust impact (β=0.53, P<0.001) of following the content of other SM group members on social learning. Driven by eudaimonism, learners engage in creating content and discussing in SM groups. These results are in line with gamification research findings (Leclercq et al.) that introduces enjoyment, cooperation, contribution in the social and curiosity as motivations to engage in co-creation communities (2017; 2018).

The present hypothesized that members of the group would mirror the content creation of their active fellow learners. Although this hypothesis is validated, the mirroring behavior does not robustly improve “course self-efficacy.” Findings show that indirect effect of social learning on “course self-efficacy” through “content creation” is not very strong (β=0.06). Users who are driven by eudaimonism to create content in the course-related SM group might enjoy a higher increase in course self-efficacy (β=0.211), compared to users whose content creation is driven by social learning. This finding supports the typology of users introduced by Leclercq et al. (2017), suggesting that users are driven by a variety of motivations to create content in online communities. These results are also in line with Dougherty and Andercheck, (2014), whose research findings showed that learners rehearse and reflect on what they have learned through content creation in course-related Facebook groups. Thus, active “content creation” encouraged by eudaimonism, translates to more reflection on the course subjects and to deeper learning, that improves the perception of learners about their capabilities to perform well in the course.

The findings of this research have implications for managers as well as for e-learning providers. According to the model discussed in the present research, when learners observe another person execute an action in a video or an SM post, or on an e-learning website, they will have the mental experience of executing the same action themselves. The observation might increase the likelihood of imitating that action in the future because they have thought about it and moreover, have
simulated executing the action themselves. So, in order to increase the course efficacy, teachers can create course-related groups in SM and encourage pupils to join and interact. They should provide the learners with an environment to observe and imitate the behaviors of more productive learners. They can encourage successful learners to reveal their useful strategies and share their notes, thoughts, ideas and studying strategies with others, by eventually rewarding them with marks.

Eudaimonic motivation encourages learners to actively participate in course-related SM groups. Being imitated by others is also a joyful experience and benefits the whole online community. Thus, managers and people in charge of the courses can create a motivating environment in which the more successful users continue content generation and self-expression activities. In order to induce a eudaimonic type of motivation, course managers and teaching staff can highlight the importance of helping others and contributing to a learning community. They can also add valuable course-related content in the group such as reports on the state of the art technologies or the latest scientific achievements. They can ask students to share links to relevant videos or SM pages that supplement the course material. Regular online meetings with the learners to engage them in problem-solving or brainstorming can also stimulate eudaimonic motivation. Gamification features can also encourage curiosity and satisfy eudaimonic motivation. For this purpose, teachers can pose a challenging question or a problem to be solved, with an incentive for the winner or the whole group.

Dabbagh and Kitsantas (2012) contend that college faculties are integrating SM into teaching and learning experiences in order to reinforce teaching effectiveness. They suggest teachers can encourage students to use blogs, wikis, and social networking sites like Facebook in order to create, organize and share course-related content. These SM spaces allow learners to access course materials and create content based on their reflections on learning tasks and assignments. Dougherty and Andercheck (2014) studied a Facebook group created for students of an offline class of more than 200 students. They found that the more students participated in the group by commenting, creating content and following the contents of their classmates, the more they felt belonged to the physical class. Students who actively participated in the course-related group, experienced higher levels of learning and course accomplishment. The scores of their quiz and final exam improved. They performed better in course assignments, and wrote stronger papers and had a higher self-efficacy. Likewise, findings of the present study support the role of SM engagement in increasing course self-efficacy.

7. Conclusion, Limits and Future Research Directions

This paper discusses the phenomenon of social learning through course-related SM. A model is suggested and tested. It proposes that eudaimonic motivation, as well as social learning, encourages learners to engage in SM groups created around their course subjects and learning purposes. Social learning and course-related interactions happening in the SM groups will then translate into a more effective learning experience and better scores at the exam. The results confirmed all the hypotheses.

This research has studied the role of mirror neurons and theory of mind in learning by imitation and how such neuroscientific concepts support social learning and course effectiveness, following
previous research in the field of Neuroscience (e.g., Rizzolatti and Craighero, 2004; Giret et al., 2017) and social psychology (e.g., Birchmore, 2015; LaFrance, 1985; Van Swol, 2003). The results showed that eudaimonic motivation encourages both “content creation” and “following” behavior.

Like any research, this paper has limits. For example, this study does not show why some users might follow the contents created by others invisibly, while some others engage in providing content. The results also do not show the behaviors of learners during the course and near the end of the course. Do the participants engage in social learning just at times they have exams? The present paper does not address the effects of different disciplines and the subjects of the study. This study does not differentiate between courses imposed by the organizations and the courses that users enroll voluntarily. This paper has not studied the potential errors and adaptations that may occur during social learning misinterpretation of observed behaviors. All these results bring us to perform better for the next research.

Future research can study the role of such learning variations due to potential imitation errors. Colleagues can study the reason why different learners show diverse behaviors and the process of participation is shaped. Scholars can also compare the effectiveness of cognitive e-learning and mirror neuron induced in e-learning.

8. References


9. Appendix (A) – Questionnaire

1. Screening question:
1.1 Have you recently finished a course by using e-learning or have participated in offline courses in which you have been connected to your teacher via social media?
   • If yes, which e-learning system have you used?

1.2 Did you join a social media group with your classmates, for example, a page on Facebook created for the class, or a group on Slack, or on another social media (SM)?
1.3 Which Social Media system did you use?

For each question, please choose 5 if you strongly agree with the statement, 4 if you agree to some extent and 1 if you strongly disagree with it. 2 means you disagree with the statement to some extent. If you have no idea about the answer, please choose 3.


I could manage my time properly during this course
I could manage to perform my research assignments for this course
I performed well on my final exam
I could take good class notes during the lectures
I think I can apply what I have learned in real work situations
I think this course added to my knowledge

Social Learning: Modified from Peralta & Steele (2010)

The classmates to whom I associate most answered the questions others asked in the Social Media group
The classmates to whom I associate most posted course-related ideas and contents in the Social Media group
The classmates to whom I associate most, shared course materials in the Social Media group
The classmates to whom I associate most shared their class notes in the Social Media group
Following:

I read what other participants had asked each other in the Social Media group in order to understand the subjects better
I frequently scanned the Social Media group contents to see what useful ideas others had provided
I often followed the group content to see if my classmates had uploaded course materials
I followed the Social Media group content to make sure I had not lost any assigned task

Content creation: Modified from Hu et al. (2015)

I often posted my opinions about class subjects in the Social Media group
I often posted photos and contents related to the class subjects in the Social Media group
In the Social Media group, I often posted my comments about the information provided in the group
If I didn’t understand a subject, I would post my question on the Social Media group
Whenever I had an idea that could promote the subject of the course, I posted it on the group

Eudaimonism: Modified from Waterman et al. (2010)

Participating in the Social Media group helped me discover who I really am
Participating in the Social Media group helped me find out what my best potentials are
Participating in the Social Media group helped develop my potentials
Participating in the Social Media group was worth investing my time and effort
Participating in the Social Media group helped me find my purpose in life