Does peer-review feedback promote interpersonal relationships among Ph.D. students and supervisors? A self-determination theory (SDT) perspective

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Abstract

Postgraduate research students (Ph.D.) are more likely to feel isolated studying their own topic. Consequently, chronic isolation, i.e., lack of social interaction, brings negative impacts, e.g., dropping out from the research program. Nudge is a concept that proposes that subtle changes in the way choices are stated can intuitively guide citizens towards desired behaviors, i.e., focus on driving behaviors and decisions. Nudge deck, i.e., sending a personal normative message such as peer-review feedback and emails to students, increases motivation and effort, and this may also be effective for relationship building. It can be envisaged that zero-cost online peer-reviewing tools such as google excel/word (peer-review feedback and email reminders as personal normative messages) guide students to improve their relationships among i) work colleagues and ii) supervisors. SDT needs of autonomy, competence, and relatedness are needed for the students to be intrinsically motivated. To address these SDT need satisfaction in interpersonal relationships, we conducted a BPNSS 9-item scale questionnaire survey among n=35 students from nine countries (relationships with colleagues, n=17; relationship with supervisors, n=18). The result of the study has shown that they may have felt a sense of connectedness with the supervisors (more competency and relatedness level). In contrast, their autonomy level is higher when interacting with colleagues.

Keywords

Feedback, Nudge, SDT, PhD Students, Persuasive Technology.

1. Introduction

Central to self-determination theory is the core concept of basic psychological needs that are understood to the innate and collective. According to the SDT theory, there are three psychological needs: autonomy, competence, and relatedness, and these needs must be ongoingly convinced for the citizen to develop and function in healthy ways [1]. These three needs of SDT are needed for the citizens to be intrinsically motivated [1]. Autonomy is the feeling that an individual can monitor an individual's actions and determine what to do [2]. Competence implies one's sense of skill, capacity, and mastery of tasks and challenges [3]. Relatedness is the feeling of being part of a wider community [4], for instance, research students in a research group with supervisors and colleagues. SDT seeks to underline how, why, and in what con-texts people's behavior is self-motivated [4].

Martin and their colleagues [5] found that autonomy support of healthcare practitioners promotes patients to engage in healthier behavior, encourages their perceived competence in those behaviors, and

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boosts their sense of mindfulness, assisting them in meeting the SDT needs of autonomy, competence, and relatedness. Most research on SDT has been performed on its relevance to learning [6], principally in the context of student motivation [7]. The empirical literature highlighting the beneficial effects of SDT needs satisfaction is expanding rapidly [8]. However, it needs to be clarified about employing SDT needs within the domain of postgraduate research [9], precisely their motivation.

Much research applies techniques such as gamification to motivate students in their education and learning. One has shown that gamified systems increased students' progression but not their social relationships with colleagues and supervisors [10]. In their [10] gamified system, they applied an individual game-design element, and it was not an open-source tool (participants had to install it from the University domain). Hence our study is based on this research gap. We utilized an online tool such as google drive (feedback message), which is entirely free to use. We adopted the model [11] to design the online system. In this research, we aim to find out if the feedback message in an available online tool such as google word/excel supports building an interpersonal relationship among research students and work colleagues. Thus, this research seeks to find the research question,

Does the feedback message in the online tool guide students to improve their relationships with i) work colleagues and ii) supervisors through fulfilling three SDT needs of autonomy, competence, and relatedness?

To answer the research question, we conducted a questionnaire survey by applying BPNSS (Basic Psychological Need Satisfaction) 9-item scale-based questionnaire [12] among research students.

The remainder of this paper is organized as follows. Section two describes inter-personal relationships. The third section is about the nudge. Section four describes methods. In sections five and six, we presented the results and discussion and concluded in section seven.

2. Interpersonal relationships

The notion that fulfilling one's desire for connection in an interpersonal bond, such as with a best friend, can anticipate the level of contentment in that relationship seems almost self-evident. Research has demonstrated a substantial correlation be-tween the extent to which the need for connection is satisfied in each relationship and the level of attachment security and relationship quality with that individual [12]. However, what's more intriguing is that the degree to which one attains the fulfillment of the requirements for independence and expertise within those relationships also foretells attachment security and relationship quality with those partners [12].

The research students with whom other colleagues and supervisors collaborate might have different educational and work backgrounds. Therefore, it is essential to make a supporting network platform that can be called on to promote experience in the multi-disciplinary setting [13]. Socialization is vital in ensuring more significant interaction among network participants, especially for postgraduate research students. This is because a robust network platform is crucial for future collaboration and career advancement [13]. Social interaction enables a flexible ecosystem where participants such as research students share their ideas, collect, and join to form relationships [13]. In a social environment, research trainees such as students "ac-quire the values and attitudes, the interests, skills, and knowledge, in short, the culture, current in the groups of which they are, or seek to become a member" [14].

Moreover, efforts could be put together to highlight a networking platform for the socialization of research students in their everyday research tasks and scholarly activities [15], e.g., sharing their ideas, values, thoughts, and experience with others, precisely their colleagues and supervisors. Researchers applied self-determination theory to develop an intervention that increased users' social connectedness [16]. Therefore, a nudging technique can add value to joining them in this networking platform.

3. Nudge deck

Failed attempts have been made at persuasive design as key stakeholders, i.e., users must fully understand what factors could lead to behavior change [17,18]. Theoretical frameworks are available, but these are repeatedly found inaccessible by the stakeholders, specifically during the design meetings, because they need to be more complex, lengthy, and presented in a direction that does not support the design process [17,19]. However, designers often need help understanding and taking support from

behavioral theory. It needs to be clarified to what extent behavioral change theories are applied to implement behavioral change intervention [20].

Cues can influence citizens' behavior in the atmosphere, repeatedly processed outside of conscious awareness [21]. To this extent, the nudging concept has been introduced by Thaler and Sunstein [22] to imply that we can influence our knowledge and learning around cognitive biases to change behavior in a positive path. Previous work of interventions persuaded them towards heathy in an office setting [23] and even showed that that intervention stimulated employees' stair use [24]. Nudging can also be considered a cost-effective intervention and sometimes zero-cost, which enable people to make choices that they choose to be their personal choices or decisions [25]. Normative messages as a way of nudging have been used to decrease meat consumption [26], and positive anticipated emotions to influence physical activity [27,28].

Giving students normative feedback can provide them with an understanding of the behaviors needed to succeed, and recent research indicates that it can enhance their efforts. The effectiveness of normative emails in increasing motivation and effort among students is contingent upon how well the motivational appeal of the norm aligns with the learning activity's objective.

In prior work, Caraban and their colleagues [29] examined that knowledge of how nudging has occurred needs to be completed. There needs to be more understanding of the long-term effects of nudging within the technology domain. They also suggested future studies on the field trials of nudging interventions to explore long-term effects and once nudges are removed. Our study follows the above suggestions for thorough long-term nudging effects and field trials.

4. Method

Study design. To perceive the effects of the online open-source digital tools on students' SDT basic needs satisfaction in interpersonal relationships, a survey study, i.e., a 9-item scale-based questionnaire (using the BPNSS measurement technique) by [12], was conducted with research students. All the students participated in the study in response to an invitation that was sent to them earlier before the survey. The study was taken for two weeks between the 15th to 28th of February 2023. One researcher based in Finland was responsible for conducting the study online.

Participants. To recruit the participants, an invitation email to take part in the study was sent out to the research students. The email invitation was sent out based on personal contacts of research institutes from Finland (LUT University, University of Oulu), the UK (University of Edinburgh), Germany (University of Ulm), the USA (UC Merced), and Ireland (SETU). All the invited students were enrolled at the Ph.D. level full-time or part-time and used any digital intervention such as google drive for their daily task submission. Thus, we concluded our survey study with 35 active participants (relationships with colleagues, n=17; relationship with supervisors, n=18), 11 females and 16 males, aged 25-44 years. These participants' origins are Bangladesh, China, Ghana, Iran, India, Indonesia, Finland, Russia, and Nigeria. These participants responded and consented to participate in the survey study and completed the online forms sent to them. Two forms have been circulated to them, one for relationships with colleagues and the other for the relationship with supervisors.

Questionnaire. As mentioned, the BPNSS measurement questionnaire used a 9-item scale [12] addressing the need for interpersonal relationship satisfaction. The questionnaires used the 7-Likert scale as: Not at all true (1); Not true (2); Somewhat not true (3); Neither true nor false (4); Somewhat true (5); True (6); Very true (7). Table 1 shows the BPNSS questionnaire for autonomy, competence, and relatedness. The reverse questions (R) were evaluated by subtracting the answer of the participants from 8 (for instance, if a participant filled in two, then it should be (8-2) = 6. In the BPNSS Questionnaire, Autonomy A: 1, 5, 9(R); Competence C: 2, 4(R), 7; Relatedness: 3, 6(R), 8. For each need, we quantify their answers by adding all the answers and making it an average. An example, Autonomy, A = Q1 + Q5 + Q9(R) / 3 = actual autonomy answer, Competence, C = Q2 + Q4(R) + Q7 / 2 = actual competence, and Relatedness, R = Q3 + Q6(R) + Q8 / 3 = actual relatedness. In this way, we calculated the students' level of autonomy, competence, and relatedness. In addition to the questionnaire, we also asked participants about their agreement whether the feedback message in an available tool such as google word/excel (for the peer-reviewing feedback) is helpful in building healthy relationships with their supervisors and working colleagues.

Table 1
BNPSS questionnaire concerning working colleagues.

n	Questions	SDT needs
Q1	When I am with work colleagues, I feel free to be who I am.	autonomy
Q2	When I am with work colleagues, I feel like a competent person.	competence
Q3	When I am with work colleagues, I feel loved and cared about.	relatedness
Q4	When I am with work colleagues, I often feel inadequate or incompetent. (R)	competence
Q5	When I am with work colleagues, I have a say in what happens, and I can voice my opinion.	autonomy
Q6	When I am with work colleagues, I often feel a lot of distance in our relationship. (R)	relatedness
Q7	When I am with work colleagues, I feel very capable and effective.	competence
Q8	When I am with work colleagues, I feel a lot of closeness and intimacy.	relatedness
Q9	When I am with work colleagues, I feel controlled and pressured to be certain ways. (R)	autonomy

Table 1
BNPSS questionnaire concerning working supervisors.

n	Questions	SDT needs
Q1	When I am with supervisors, I feel free to be who I am.	autonomy
Q2	When I am with supervisors, I feel like a competent person.	competence
Q3	When I am with supervisors, I feel loved and cared about.	relatedness
Q4	When I am with supervisors, I often feel inadequate or incompetent. (R)	competence
Q5	When I am with supervisors, I have a say in what happens, and I can voice my opinion.	autonomy
Q6	When I am with supervisors, I often feel a lot of distance in our relationship. (R)	relatedness
Q7	When I am with supervisors, I feel very capable and effective.	competence
Q8	When I am with supervisors, I feel a lot of closeness and intimacy.	relatedness
Q9	When I am with supervisors, I feel controlled and pressured to be certain ways. (R)	autonomy

Procedure. The questionnaire sets were sent out to the participants with a short de-scription of it. They filled out the quantitative questionnaire. Google form was ap-plied to store and manage the data gathered during the online survey data collection. For the statistical analysis, the data were analyzed automatically from the Google form (responses), which showed the average of the questions' answers as well as the graphical overview. The mean for each of the levels of psychological needs of autonomy, relatedness, and competence was calculated individually.

5. Results

Interpersonal relationships with supervisors. We found the autonomy level, A = Q1 + Q5 + Q9(R) / 3 = actual autonomy (4.4). Thus, participants' autonomy level was equal or greater to the Likert scale 4 (neither true nor false). We found the competence level, C = Q2 + Q4(R) + Q7 / 3 = actual

competence (4.7). Thus, the participants' competence level was equal or greater to the Likert scale 4 (neither true nor false). We found the relatedness level, R = Q3 + Q6(R) + Q 8/ 3 = actual relatedness (4.16). Thus, participants' relatedness level was equal or greater to the Likert scale 4 (neither true nor false).

Interpersonal relationships with colleagues. We found the autonomy level, A = Q1 + Q5 + Q9(R) / 3 = actual autonomy (5.2). Thus, participants' autonomy level was equal or greater to the Likert scale 5 (somewhat true). We found the competence level, C = Q2 + Q4(R) + Q7 / 3 = actual competence (3). Thus, the participants' competence level was equal to the Likert scale 3 (somewhat not true). We found the relatedness level, R = Q3 + Q6 (R) + Q8 / 3 = actual relatedness (3.5). Thus, participants' relatedness level was equal or greater to the Likert scale 3 (somewhat not true).

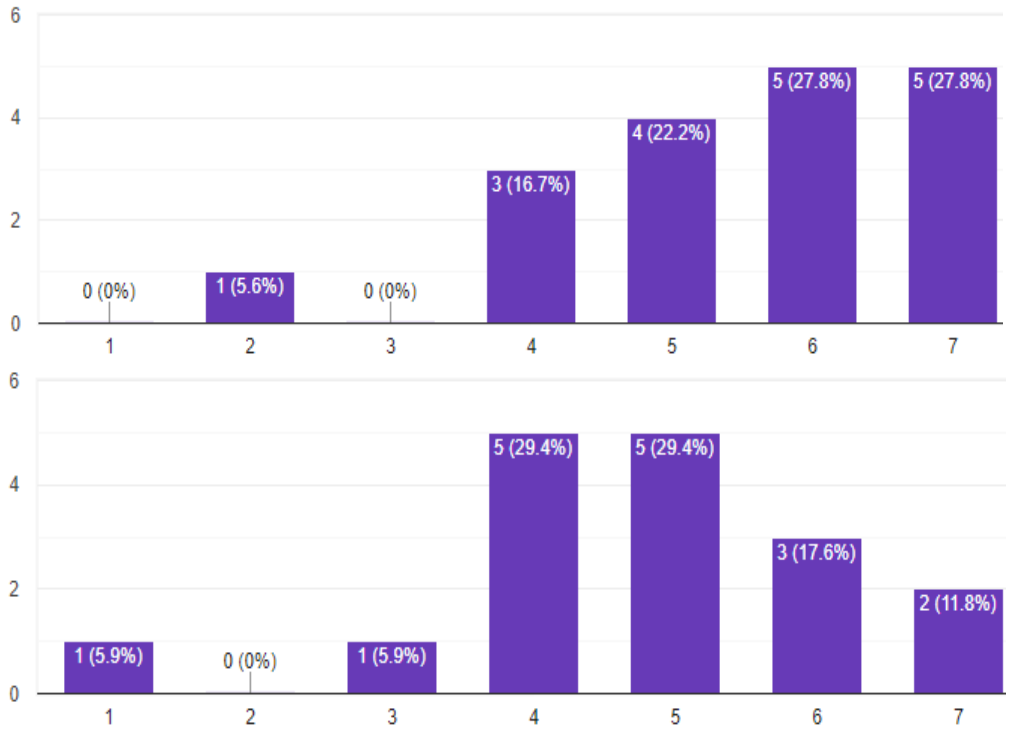

Figure 1. Graph represents participants' agreement on whether the feedback message in an open tool such as google word/excel (for the peer-reviewing feedback) is helpful or not to building an interpersonal relationship with their colleagues (first graph) and supervisors (second graph)

6. Discussions

The overall result analysis has shown a neutral comment from the participants. Students may have felt a sense of connectedness with the supervisors (more competency and relatedness level) than the working colleagues. This may be due to the knowledge and expertise of the supervisors in the same field students are researching. While on the other hand, working colleagues do not have similar tasks (as students work on their own research topics separate from others).

In the context of relationship building with supervisors, participants' answer was neither true nor false when they thought of connecting with supervisors using online tools. Supervisors' constructive feedback is vital to reliable doctoral dissertations [30]. One of the key issues to highlight is the need for more clarity and transparency between student supervisors. For example, the student may expect to get more solid and concrete feedback and research direction to follow. This leads to a communication gap between them, such as physical and online meetups needing to be more than students' expectations. In a study by [31], the author examined student engagement and challenges related to supervisory feedback. The research found notable differences between the perceptions of supervisors and students, particularly in areas such as student engagement, research experiences, and the various factors that contribute to challenges in supervisory feedback. Maybe some sort of fear was working within them; they

were puzzled about what would happen in the meeting when sharing their work progress and getting feedback from them.

In the context of relationship building with working colleagues, students did not feel that their competency and relatedness level increased due to receiving peer-reviewing feedback from working colleagues using online tools. Maybe there have been some workplace envy and jealousy among them [32]. Thus, students may re-quire leadership training during their course degree as effective leadership can ad-just the existence of various types of envy and transform it into the actual productivity of the workplace [33].

Students' anxiety is relevant to their academic performance [34], such as reducing daily autonomy levels toward study progression. In our study, most participants' autonomy level was higher. The factors in increasing their autonomy level may be a positive vibe to meet with working colleagues, talks about progress reports or re-search plan writing, and related work reviews. One possible thing is that students might have a daily goal to meet the long-term milestone and divide their tasks into small daily portions to work daily towards a more significant milestone to increment their autonomy level.

Students' competence level could have been higher, indicating they might need to be more self-confident in doing their research study. Most participants' relatedness level was higher, meaning that most students have not experienced group work facilitated learning [35].

Getting feedback while doing peer-reviewing tasks using the online tool might bring positive effects, such as building a strong interpersonal relationship while using the real online tool. As in our study, participants only filled out the questionnaire but did not use the tool but pretended to have applied them. This directed us to further our research to go for a longitudinal study with an online tool.

7. Conclusions

This paper investigates three SDT needs of autonomy, competence, and relatedness and how these needs can play a vital role in motivating research students. To measure this, we examined how the nudging technique (feedback message as a peer-reviewing task in an online tool) guides students in improving their interpersonal relationships with work colleagues and supervisors. We analyzed the survey data by utilizing the BPNSS measurement technique, which the students filled up. We found the autonomy level is higher when students are connected with colleagues, while the competence and relatedness level is low. On the other hand, they may have felt a sense of connectedness with the supervisors (more competency and relatedness level), while their autonomy level is higher when interacting with colleagues. We recommend further research into this topic using feedback from online tools in the actual workplace context of the students.

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