Open Issues in Educational Affective Recommendations for Distance Learning Scenarios

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Abstract. Despite psychological research showing that there is a strong relationship between learners' affective state and the learning process, affection is often neglected by distance learning (DL) educators. In this paper we discuss some issues which arise when eliciting personalized affective recommendations for DL scenarios. These issues were identified in the course of applying the TORMES user centered engineering approach to involve relevant stakeholders (i.e. educators) in an affective recommendation elicitation process.

Keywords: Educational recommender systems, affective computing, distance learning, educational scenarios.

1 Introduction

Recommender systems should help and support both learners and educators in educational web based scenarios [1]. Very often, this support has been given in terms of content to be read by the learners to reduce the information overload (see relevant compilations of educational recommenders in [2-6]), while educational scenarios might offer richer recommendation opportunities that involve the usage of learning services [7]. Moreover, psychological research shows that there is a strong relationship between the learners' affective state and the learning process [8-9]. However, to date there have been only a few recommender systems in educational scenarios that have considered affective issues. They have been used to 1) recommend courses according to the inferred emotional information about the user [10], 2) customize delivered learning materials depending on the learner emotional state and learning context [11] and 3) provide the list of most suitable resources given the learner affective state, provided that the learner fills in i) her current affective state (flow, frustrated, etc.) and ii) her learning objectives [12].

In the past, we have been researching on eliciting educational oriented recommendations to identify recommendation opportunities that go beyond reducing the information overload in learning management systems. Thus, in order to support educators in the elicitation process, we proposed the TORMES methodology [14]. TORMES

adapts the ISO standard 9241-210 to help educators identifying when, who, what, how, where and why educational support needs to be provided to each particular learner in a given educational scenario, as well as on which features characterize the recommendations. When we came to take into account affective issues in the learning process within the MAMIPEC project [29], TORMES methodology was extended to explicitly support educators in eliciting recommendation opportunities that involved emotional feedback [25]. An initial application of TORMES was done with 3 educators particularly concerned with teaching strategies that incorporate the affective dimensions. Moreover, additional 12 educators, who have not taken part in the elicitation process, were asked to evaluate 12 of the 47 affective scenarios elicited and their corresponding potential recommendations. Preliminary outcomes of this application have been reported elsewhere [27, 28]. In general terms, educators who evaluated the recommendations elicited found them as valuable affective pedagogical interventions. However, some open issues were identified. In some cases, educators pointed out that applying recommendations into real practice was beyond their capabilities. In particular, they reported difficulties in detecting the need of affective support in real learning scenarios, which in our view, shows that DL educators might not intervene in certain valuable affective ways due to the lack of resources and training related to dealing with the student affective state and applying appropriate intervention strategies.

In this context, the goal of this paper is not to report on experiment findings, but to reflect on the work done so far and identify open issues relevant to affective recommender system research to be shared and discussed during the workshop with the rest of the participants. In this way, next we present the open issues identified and after that, we comment on how, in our view and experience, they can be addressed.

2 Identified open issues concerning affective educational support in DL

From our past experience, review of the pertinent literature, and outcomes from the application of TORMES, we have identified 5 open issues that mainly involve a lack of resources and training concerning affective teaching on the part of DL educators.

2.1 Scarce reported experiences on affective support in DL scenarios

Although general models of affective support in e-learning have been proposed (as in the case of [13]) and some positive studies have been reported (such as [15]) on the commitment of DL institutions with the principles of an "affective teaching", to date, affection is often neglected by DL educators. Educators have mainly focused on the cognitive domain of learning [30] and they have ignored its affective domain. As consequence educators are poorly trained in affective teaching strategies. In fact, there is no literature on the term "affective teaching" itself, but only on affective learning, and the significant literature about academic emotions [16-18] focus on face to face learning experiences usually concerning students of secondary and higher education. In any case, it is acknowledge the benefits of providing a positive emotional climate

[36] where learners are happy and feet well supported in their learning [37, 38], since a climate built on mutual trust could encourage learners to take on new learning challenges as they would not be afraid of making mistakes [38].

However, distinctive and unique affective experience issues intricately linked to the computer interaction experience (supported by e-learning platforms) concern DL students. In our view, their singularity and the distance context itself should give rise to particular educational scenarios and affective responses that require particular approaches of student affective support. Thus, we consider of importance to analyze the diversity of scenarios with affective relevance that may arise in DL contexts.

2.2 Affective needs in DL

There is abundant literature characterizing distance learners [21-22]. Learning provide new stimulus to these students, guided by intrinsic motivations, and determine the mobilization of intense emotions. But it is essential to consider that learning for adult students entails different characteristics to those belonging to other population groups. Adult students feel less fitted, and tiredness and lack of time are consequences of their socio-occupational status. Learning requires great personal sacrifices that do not prevent very long study times. Demotivation is the main cause of dropout. The quality of electronic communications is not enough to satisfy socialization needs, and causes conflicts with affective implications [23-24]. Taking into account these factors educators should consider how affective issues could impact on the learning process [31], helping learners to recognize and manage their own emotions, by increasing motivation, facing critics, etc. Affective learning is subject of consideration particularly in the case of students with disabilities, who tend to choose the distance modality and thus difficulties caused by their own characteristics should be considered when they are communicating or understanding emotions showed by others. Sometimes disabilities involve deficits in the different stages of affective processing (sensing, expressing, or interpreting affect-relevant signals). Consequently, people with these kinds of disabilities can be considered emotionally handicapped [39]. Besides, adult students deserve a treatment different from young face-to-face students, demanding more participative teaching approaches, subtle and suggestive support, respect and appreciation of their experience, further reinforcement and motivation, friendliness and closeness.

2.3 Difficulties of affective communication in virtual learning communities

In DL, given the lack of straightforward information on student affective states, this is inferred from various sources, such as forum and email messages, as well as occasional telephone calls that express emotions more or less directly. Frequency of learners' communications and interactions in virtual courses may also indicate hidden emotional states. There is no doubt that it is difficult to assess with certainty the emotions involved, their intensity, their permanency, etc. only from these information sources, providing they facilitate emotional dishonest information about their feelings and emotions because they feel more vulnerable and incapable. Moreover, the educa-

tor must express affection to her students to dissolve the students' natural tendency to resist being told what to do, so the advice can penetrate more deeply and effectively [34]. Humor can be use as a tool to make the topic or subject seem more relevant to learners' own experiences [36], as it can engender trust and mutual respect and made every effort to be flexible in order to provide a learning environment that encouraged pupil participation [37].

Another issue here, is the difficulty of affective communication influences not only learning itself, but social relationships in virtual communities [18-20], among others. Virtual learning communities often are a meeting place between students and educators. Accordingly, social relationships are a key aspect of learning since if the learner has not adequate social competences, she will not be able to acquire and share information and knowledge with others, receive feedback about her beliefs, work, etc., impeding her to modify or improve them.

2.4 Reduced scope of the affective support provided in current approaches

In the last century different authors have examined the domains of learning and they identified levels of learning in affective domain. The affective domain covers motivation, emotions, values, attitudes and behaviors [32]. Thus, affective support should take into consideration student psychological factors such as attitudes, beliefs, motivation and thoughts. However, current affective research focuses almost exclusively on increasing learners' motivation. Thus, no emphasis is done on providing learners with emotional regulation strategies for the benefit of the learning process. These strategies include activities and resources to improve the ability to listen, demonstrate attitudes, revise judgments and change an inadequate behavior and could be provided through educational oriented recommendations focused on recommending specific actions to be carried out by the learners.

2.5 Lack of resources for educators to provide affective support

In general educators, and more specifically distance educators, face difficulties when teaching affective outcomes, they consider that these issues are private and far too long term to be integrated into any learning program [33]. As consequence, distance education teachers are not usually aware of the impact of affection in learning, and are not used to provide affective support to their learners, despite the fact that underlying any instruction there is always an implicit affective support strategy. Therefore, a methodology is needed to help educators elicit recommendation opportunities in their teaching scenarios. However, we could not find in the literature of educational recommender systems [2-6] methodological approaches to support the recommendations elicitation process except for the TORMES methodology that we have applied.

3   Discussion on ways to address the open issues

Educational recommender systems can model the affective issues involved during the learning process, considering that this modeling has to be managed and integrated with the rest of existing e-learning services. Given the open issues in affective learning theories, the heuristic knowledge that is applied in everyday instruction practice in learning institutions might be of great importance. As for the current literature on this topic, large parts of this knowledge have not yet been collected.

Moreover, in our view, there is a lack of methodological approaches to support the recommendation elicitation process in user modeling and personalized educational scenarios. This need is even more critical in distance teaching, where affective support would be very valuable but has been usually neglected. In view of the above, we propose the involvement of educators in order to carry out an exhaustive and methodical compilation of heuristics concerning affective learning in DL contexts, as already suggested in the literature (e.g., see [8]), by applying TORMES.

As shown, the TORMES methodology can be of help to support eliciting recommendation opportunities in which affective issues can be addressed to support the learning process from educators [25]. In past experiments [26]), which did not focus on affective issues, we already found a statistically significant positive impact on indicators dealing with engagement in the course, learning effectiveness and efficiency, and knowledge acquisition when educational recommendations are delivered to learners in the learning management systems.

From the evaluation activity we carried out [28], it appeared that there is little awareness and little training regarding affective educational dimension but a latent sensibility to the issue. It will be therefore advisable to extend and reformulate the elicited recommendations in the light of an affective teaching model that incorporates the theory and experiences of face-to-face courses translated to a DL context. Moreover, we belief necessary deepen the rich emotional universe of DL students by also engaging them in an affective scenario elicitation process.

Finally, the limitations on affective communication in DL scenarios are more difficult to address. We are currently working hard in the automatic detection of emotions on the basis of physiological parameters, but we are aware of the risks of misinterpretations inherent in context-aware system approaches, mainly when they involve such complex factors as emotions.

In summary, integrating affective recommender systems in e-learning platforms could contribute to raising awareness and training for an affective teaching. Thus, these systems could provide undoubtedly added value to e-learning platforms.

Acknowledgments

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