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Affective Computing: A Closer View of Self-Reported Instruments in Education

Elaheh Yadegaridehkordi [a,*], Nurul Fazmidar Mohd Noor [b], Mohamad Nizam Ayub [b], Hannyzzura Affal [b], Nornazlita Hussin [b]

[a] Department of Software Engineering, Faculty of Computer Science & Information Technology, University of Malaya, 50603 Kuala Lumpur, Malaysia
[b] Department of Computer Systems & Technology, Faculty of Computer Science & Information Technology, University of Malaya, 50603 Kuala Lumpur, Malaysia

*** Corresponding author email address**: yellahe@gmail.com

Abstract

The trends of affective computing have rapidly become an issue in educational settings. Even self-reported instruments have been the most popular class of instruments for emotional experience assessment over the past years, there are deficiencies in the in-depth literature review and classification of research based on these affective recognition instruments. For that reason, this study focused on the self-reported instruments and reviewed 18 related studies from IEEE Xplore, ScienceDirect, and Springer link databases published from 2010 to 2015, and categorized them based on affective recognition instrument, affective classification, and learning domain. Finally, this study provides insight and future direction on self-reported affective computing instruments for both researchers and practitioners.

Keywords: Self-reported instruments, Affective computing, Educational settings

1. Introduction

Emotions are considered as individual experiences which are rely on the condition in which they appear (Linnenbrink, 2006). Emotions are an essential part of daily routine, where they influence human behaviour, their thinking ability and how do they communicate with others (Subramainan, Yusoff, & Mahmoud, 2015). Research in integrating affective components to humanlike agent has increased over decade in order to improve the effectiveness of human computer/robot interactions (Ammar & Neji, 2006). Recently, Affective Computing (AC) has become one of the most interesting research topics. Outcomes from the affective states recognition are useful to analysis the user reactions to expect behavioural intentions and to create reasonable responses. Therefore, proposed systems and their user interface in potential applications can be improved (Handayani et al., 2014). Further, the incorporation of emotion detection can significantly advance the borders of educational technologies and offer some additional values to enhance the overall distance learning experience as well as providing new opportunities for the low cost delivery of teaching and learning programs (Caballé, 2015).

Educational environments provide a foundation of appearing different emotions which need to be managed. Emotions significantly affect users' learning and play a critical role in their decision making, managing learning activities, timing, and reflecting on the studies. Emotions are also vital in teaching and learning processes and usually cause different reactions with others and increase motivation in learning (Sandanayake & Madurapperuma, 2013). Therefore, to identify the relationships between emotional, cognitive and motivational features of learning, reliable methods of emotion recognition in an academic context are critical (Burić et al., 2016).

The trends of affective computing have rapidly become an issue in the education context (Wu et al., 2015) and can be recognize through different instruments such as self-report conventional text or questionnaire, skin conductance, heartbeat, facial expression, electroencephalography (EEG), electromyography (EMG) verbalization, and speech. Detecting the physical emotions requires additional hardware to recognize body gestures and positions, prosodic features and psycho-physiological data that is matched with various emotional meanings. Drawbacks of this method are obtaining large amount of data and also that hardware is disturbing and prone to failure (Muñoz et al., , 2010). Sensors are most popular used devices able to get