ABSTRACT
This research attempts to describe the identity development of students/teachers who used a virtual social network—Facebook to work with historical mathematics and mathematicians in the frame of a second degree course. Fifteen participants aged from 24 to 53 years old participated in the course in which they were required to attend mathematical Facebook sites involved with math history. The research findings arrived at using the grounded theory approach indicate that working with historical mathematicians and talking and discussing their work in virtual social networks, students/teachers developed their identity in four aspects: (1) the educational aspect, (2) the cultural aspect, (3) the personality aspect, and (4) the ethnic aspect. These identity aspects were developed due to the different conditions of the learning environment, together with the actions/interactions of the participants. Specifically, working with the history of mathematics in virtual social networks made the participants aware of (1) the advantages of integrating technology in learning and teaching, (2) the advantages of integrating history in the learning and teaching of mathematics and science, and (3) the possibility to move their culture to one that is involved more in science and mathematics. In addition, working with the history of mathematics in virtual social networks made the participants proud of their heritage and as a result they increased their self-esteem.

INTRODUCTION
Identity has a double sense, where it refers to social traits, and at the same time, to the sources of a person’s self-respect or dignity (Fearon, 1999). In this research we assume that identity is not a fixed and coherent set of traits, but something complex, which is subject to change across time and place (Morgan, 2004). Identities thus could be influenced by different factors as history, experiences and belonging groups. Specifically, teachers and students’ identities are influenced by individual factors, as well as social ones. At the same time, these identities influence teachers’ practices in the classroom, as well as students’ learning, where positive image of the identity influences positively teaching and learning consequences and...
vice versa. An issue which attracts researchers’ interest in the evolving virtual social networks is their ability to behold educational transactions and the influence of these transactions on students and teachers’ different identity aspects. This research attempts to examine the identity aspect of working educationally in virtual social networks, specifically in Facebook, where three educational mathematical sites were constructed: a character representing a historical mathematician: Al-Khwarizmi; a fan group of another historical mathematician: Al-Khayyam; and a page about a mathematical phenomenon: the golden ratio. In this article, the first two sites are considered, where postgraduate students developed social, cultural and mathematical talks, connecting past and present and at the same time discussing their cultural and mathematical present, in addition to possible teaching and learning acts that could change that present.

Literature Review

Identity is a construct which could be related to various psychological and social constructs affecting the individual’s perceptions, attitudes and behavior (Stets & Burke, 2000). This construct has been attended to increasingly in electronic environments, especially in social networking sites. From the other side, educational researchers have been engaged in studying this construct because of its influence on teachers and students. Here we are interested in studying the construct when students and teachers participate in social networking sites in the frame of a graduate course that raises digital media’s uses in education.

Identity as Construct

Identity is reported in the literature to have different components. Some researchers (Davis, 2008; Toulouse, 2007) characterize the identity construct as comprising of four components: the intellectual component, the emotional component, the physical and the spiritual, where Toulouse (ibid) identifies identity with self esteem. On the other hand, Grootenboer, Smith and Lowrie (2006) state that three views of identity appear to be particularly prevailing and influential: (1) the psychological/developmental: identity formation is seen as self-determined as a result of the individual adaptation or development to fit with life events and situations; (2) the socio-cultural: identity develops both within and external to the individual through social and cultural practices; and (3) the post-structural: identity formation is dynamic and somewhat unstable. It is influenced by individual factors as well as social ones. Furthermore, the Gale Encyclopedia of Psychology (2001) identifies identity as including a sense of personal continuity and of uniqueness from other people. In addition, it includes within the identity construct the social component that is based on membership in various groups: familial, ethnic, occupational, and others. This association of identity with several groups is also mentioned by Baumeister (2005) who describes identity as a composite definition of the self which is made up of several partial definitions that arise as an answer to the question: ‘who are you?’, or ‘who am I?’ These answers, according to Baumeister (ibid), are the components of identity.

As mentioned above, several researchers (for example Baumeister, 2005; Ethier & Deaux, 1994) relate identity to social conditions. Baumeister (2005) differentiates between self concept and identity, saying that self concepts exists only in one’s mind, while identity is social because it rests on the shared between a person, other people and society at large. This emphasis on identity as social construct is supported by other researchers. For example, Ethier and Deaux (1994) point out that identification with a group of people who share common attributes is an important aspect of self-definition. Further they emphasize that group membership can have significant influence on behavior, namely feelings of attraction toward members of the in-group, stereotypic judgments of out-group members, social influence, and preferential treatment toward the in-group. Other aspects of self-definition (other than identification with the group) are one’s identification with contexts or situations (Deaux & Major, 1987; Farnham...
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