The Use of Social Networks as a Tool to Increase Interest in Science and Science Literacy: A Case Study of 'Creative Minds' Facebook Page

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Abstract

Social networks are being increasingly utilized in education and learning. The unique properties of social networks highlight the importance of using them for tackling issues in science education as they reach a diverse audience and are easily accessible. This particular advantage is important when attempting to increase the public's interest in science and science literacy. Science education in Palestine remains to be traditional, and there is still a general lack of interest in science among the public. It is very important to invest in the public's interest in science in Palestine during its development process, and emphasizing informal learning activities could be an effective tool in reaching this goal. This paper highlights the impact and the role of social networks in promoting science literacy and interest in science using the Facebook page 'Creative Minds' as a case study. The 'Creative Minds' page was created in an attempt to popularize science in Palestine, promote citizen science, provide people with resources and updates related to science, raise people's interest and awareness about specific topics in science, and present a venue for interaction between people on science related matters. The study suggests that social networks may create a virtual space for informal learning of science where students and the general public may learn valuable scientific knowledge, interact with each other on science-related topics and share the science knowledge. Data from visual and text sources, semi-structured interviews, and reflection papers were collected. The case study presents examples, trends and observations, and reflections on using social networks in raising awareness and increasing the interest of students and the community in science.

1. Introduction

The emergence of web 2.0, has changed the way people learn and communicate as they emphasize sharing, participation and collaboration. As communities grow more connected through their use of social media, the distribution of knowledge within the community could be more efficient. Many web based social tools have been developed in order to manage, maintain and improve social interactions between people where people can easily access, reuse or comment on content that is authored by others. This has replaced traditional teaching by an evolving learning model which takes advantage of sharing user-created content through collaborative, non-formal learning environments allowing people to learn anytime and anywhere [1].
The process of education and learning requires daily social interactions, and schools aim to develop methods to improve the effectiveness and efficiency of collaboration among students, and with their teachers. Distributed learning environments involve teachers, students, and extend to students in different universities/schools as well as the public since they enhance the growth of effective learning communities. Social networks engage students in learning processes and support interaction between students, instructors and their communities. This study aims to highlight the impact and role of using social networks as a tool to promote and raise science literacy and interest in science specifically in the fields of science, technology, society and environment (STSE).

1.1 Science Education in Palestine

Science education, literacy and research are indicators of development as science is directly linked to the advancement of countries on both political and economic levels [2]. In Palestine, science education remains to be traditional where the students' role is limited by the textbook-driven lectures, and their performance is evaluated based on their knowledge of the textbooks [3][4]. This may inhibit the students' interest in science as they see it as a rigid topic with minimal hands-on experimentation [3]. Furthermore, there is a general lack of science culture in the Palestinian society. Science literacy is very important and achieving it is a challenge; however, developing informal science learning environments could be effective in enhancing science literacy in Palestine [2].
The Walid and Helen Kattan Science Education Project (WHKSEP), is a Palestinian project aiming at "improving the quality of science education in Palestine's schools and effectively transmitting its value into the wider society" - is making many efforts to improve science education both on educational and societal levels; this involves its informal science program which aims to contribute immensely to enhancing science culture and literacy in Palestine [3].

1.2 Social Networks and Informal Science Education

Informal science refers to the activities that occur outside the school setting, which are not developed primarily for school use, not developed to be part of an ongoing school curriculum, and characterized as voluntary as opposed to mandatory participation [5]. Informal science education is becoming increasingly popular worldwide, as it allows for a better understanding of scientific and natural phenomena as well as a better retention as it engages the learner in a personal experience. The number of social network users is growing significantly and social networks capabilities are increasingly being leveraged effectively. Furthermore, social networks are becoming less complex and more accessible; where young and older people can create and share content and interact easily through social networks. Accordingly, social networks could be employed in science education as virtual informal science learning settings. The characteristics of such technologies make them extraordinary media for raising interest and culture in science as they have been used for various educational purposes including peer-learning, teacher-student discussions, and scientist-public interactions.

2. 'Creative Minds' Facebook page

The page, 'Creative Minds', is a bilingual page where Arabic and English are the languages used, and was created in an attempt to popularize science in Palestine, promote awareness about citizen science, provide people with resources and updates related to science, encourage critical thinking and questioning, raise people's interest and awareness about specific topics in science, refute common misconceptions in science, and present a venue for interaction between people on science-related matters.
The choice of Facebook as the medium for intervention is a result of its ease of access and popularity among the Palestinian community. Moreover, the page seeks to create an interactive scientific learning environment by encouraging people to participate in positive content-related discussions. 'Creative Minds' introduces people to reliable science news resources; encouraging people to look critically at their sources of knowledge, and to collect and share useful information on the page.
The page also aspires to increase interest in and awareness about citizen science, and, in the future, encourage the audience to actively contribute to it. Many citizen science projects create online collaboration environments to enhance interaction between citizen scientists. Through interacting with the 'Creative Minds' Facebook page, the Palestinian public involved is exposed to such projects and initiatives. This "awareness stage" will be elevated to "active involvement" in citizen science projects which will be established for educational purposes.
Additionally, the page attempts to link the audience to the international and global causes, events, petitions, and competitions in order to create global awareness and connection of Palestine to the international science community. This is especially important since there is a lack of resources on such content in Arabic. The page also supports the WHKSEP's informal science program by following up with the students involved in the program's activities thus sustaining their interest in specific topics.

3. Research instruments

This study involved an analysis of 'Creative Minds' Facebook page. Visual and text data resulting from audience interactions, discussions, and engagement in science-related topics were collected and analyzed. Accordingly, the posts with the highest engagement (includes: reach, sharing, like, comments, asking and answering questions) were further studied in order to observe trends. Semi-structured interviews were conducted with 13 students who participated in two astronomy-related activities with the WHKSEP's informal science program and were active on the page. The interviews were approximately 10-15 minutes in length. Students were asked to view their previous interactions on the page to assist in their reflections. Students were asked open-ended questions about the role of Facebook in changing their interest in science in general, and maintaining their interest in astronomy. Reflection papers were collected from 15 students, where they were asked to reflect on the effect of joining 'Creative Minds' page on their interest in science. Triangulation to validate the process occurred through checking semi-structured interviews and reflection papers data against visual and text data resulting from audience interaction, and engagement in science-related topics.

4. Impact of Social Networking

The case study presents examples, trends and observations, and reflections on using social networks which can be put under three categories:

4.1 General Increase in Interest in Science

The collected data have shown an observable impact on increasing both students' and public's interest in science. Page insights have shown an increased engagement and contributions by a wider audience from different locations and ages. Moreover, it has been repeatedly observed that new audience investigated old posts by going back through the timeline, engaging with and clicking ‘Like’ on old posts. Many students indicated through interviews and reflection papers that they started making better use of their networking time as in the following excerpt: "we make use of our time by learning interesting things."

4.2 Trends

Additional trends were observed through analyzing students' reflections and users' engagement with the posts:

Pictures and Videos
Many students indicated that pictures, videos and interactive applications attract them more than text, especially those with strange information, which was also emphasized by the collected data resulting from audience engagement and interactions. One of the students stated: “text is sometimes boring, but when there's a video, I feel excited to watch it until the end and become interested in reading the text."

Topics of relevance to the everyday lives
It was significantly observed that scientific posts of relevance to people’s everyday-lives have gained much attention. This includes health awareness and environmental issues related to the Palestinian context and society. Moreover, some students expressed their interest in topics related to their curriculum. One student answered a question about favorite topics: "we are interested in topics on 'Creative Minds' that are mentioned in the class by our science teacher; this enables us to share our opinion about the subject with more confidence."

The Case of Astronomy
Astronomy is one of the topics that continuously gains significant attention from the audience. This can be seen through users' engagement, and is also expressed by many of the students interviewed; "astronomy

news are always exciting," and "astronomy is really interesting because it's untouchable, it's sort of mysterious so we always need information about it."

4.3 Changes in Standards for Resources of Information

Data from interviews and reflection papers suggest a change in the students' standards for their resources of information. Students frequently expressed their appreciation of the reliable resources presented by the page's posts. A sample of such responses includes: "I follow up with the page because I am sure that the resources are reliable and up-to-date unlike some other Arabic pages." This implies that social networks may play an important role in raising awareness about the reliable resources of information among the students and society by providing alternative sources of knowledge.

5. Conclusion and Prospect

The rigidity of science education in Palestine remains to be a challenge. Informal learning activities can be effective tools in raising interest in science. Social networks can create effective virtual informal learning environments. This case study highlighted the impact and the role of social networks in promoting science literacy and interest in science. The results imply that social networks may play a significant role in popularizing science and increasing students' motivation about science.

The study presents many implications and recommendations for teachers and educators, as well as researchers. The findings imply that such social network pages could be integrated into student-teacher discussion forums allowing school-related discussion to happen informally. Moreover, the page could be a powerful resource for teachers for new ideas, and updates in science. Additionally, increasing students' interaction about science-related topics outside the class may change students' attitudes from passive roles to active roles which might enhance their learning process. The confidence gained through such interactions may be reflected on student-performance in the classroom.

An advantage of social networks for researchers is the possibility of revealing the common misconception in science due to the level of comfort people feel while interacting on social networks. Moreover, Facebook, as a social network, provides four levels of user engagement for each post, which makes it a very useful research tool as researchers can observe and analyze the stages of engagement of the audience.

Since there is a remarkable integration between Facebook and other social networks and social media tools, extending the Facebook page into other social networks can be of a great advantage in making use of other resources and involving a wide range of communities. Moreover, there is a prospect of creating new pages specialized in specific fields (e.g. astronomy, animals of Palestine, etc.) to gather students who are interested in one field of science and give them the opportunity to participate and manage their own page. Social networks may also present a promising venue for citizen science projects where students and the public can participate in scientific research, locally and internationally, by collecting real scientific data.

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