Online Community:

Virtual Science Labs Subreddit

Giancarlo Perez-Flores

New Jersey City University Educational Technology Leadership Program

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Dr. Laura Zieger

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https://www.reddit.com/r/VirtualScienceLabs/

The onset of the world health crisis forced schools to close and implement remote learning practices due to sanitary measures. The switch to virtual learning impacted science learning drastically. Laboratory skills and experiments are keystones to science education as they contribute to developing collaboration, computational thinking, and modeling skills in students (NRC, 2012). The lack of access to laboratory facilities led science teachers to seek alternative methods and tools like data analysis (Chandrasekaran, 2020). Additionally, educators exploring virtual labs, which are computer simulations alternative to traditional labs, would benefit from professional training to implement the new technology. This paper will discuss the development of an online community focused on improving science learning and instructional practices through virtual labs.

While virtual labs were initially developed to bring equitable science learning to students without access to traditional facilities or lack of resources (Marble, 2017), the pandemic school closures have created a new need for this educational technology. Research shows that virtual labs provide similar academic outcomes as traditional physical labs (Reece & Butler, 2017). The potential of virtual labs as an alternative can be limited by a teacher's ability to implement the program. A study by Dolighan and Owen (2021) shows that the rapid switch to online learning impacted teacher efficacy. Similarly, other studies have shown that professional development is crucial in developing educators' self-efficacy to implement new technology (Geng et al., 2018; Horvitz & Beach, 2011).

Access to professional development opportunities is critical to improving teachers' self-efficacy and the successful introduction of new technology in the classroom. There are three primary sources of teachers' self-efficacy, formal, informal, and independent professional development (Barton & Dexter, 2019). However, many schools do not provide formal professional development on alternative tools outside the curriculum. Similarly, many schools only have one science teacher in each content area, limiting informal learning from peers. Thus, the purpose of the Reddit online community Virtual Science Labs, also known as the r/VirtualScienceLabs subreddit (r/VSL), is to create a space for science teachers all over the world to share information about virtual labs and collaborate.

The r/VSL is an online social community that aims to provide informal and alternative professional learning methods. A social community uses social networking platforms, Reddit in this case, to reach more significant audiences (Alida, 2016). Educators that seek independent professional growth can participate in the subreddit and ask questions about their technical and instructional issues within a particular virtual lab platform or browse through the resources available. This group aims to build on the members' intrinsic motivation to learn more about virtual labs to encourage them to join and participate in the group (Kraut et al., 2016). The resources available will combine materials created by the administrators and members of the group. Similarly, members will be able to answer questions from their peers and collaborate to improve their instructional practices with virtual labs.

The Reddit platform's goal to facilitate discussion and collaboration is incredibly beneficial to the intent of the r/VSL group. Reddit allows members to create and join groups on any topic imaginable and gain badges and achievements to engage with different groups. Additionally, since r/VSL is a subgroup of Reddit, future members will already be familiar with

the tools and features of the platform, addressing issues over a member's learning curve to participate in the community (Wenger, 2012).

The nature of Reddit promotes affirmative commitment and needs-based commitment. Since members can quickly ask public questions and search for content, they can undoubtedly build affirmative commitment once they join a group that closely resembles their interests (Kraut et al., 2016). Science teachers already members of other teaching subreddit groups will be able to easily find, join, and participate in r/VSL since it will relate to a more particular area of their practice. Additionally, r/VSL members can easily share resources with their peers, improving membership. The bonds-based commitment will develop as more members see their peers interacting within the group. Altogether, improving the affirmative and bonds-based commitment will translate into increased membership and active member participation (Kraut et al., 2016).

The r/VSL online community is designed to facilitate relevant and appropriate member collaboration. The moderator will create the initial posts and resources, and the group will remain open to the public to encourage participation from members in similar groups to attract membership (Kraut et al., 2016). The purpose of the initial posts by the moderator is to model appropriate communication and posting for the members. In addition, a small set of rules is displayed on the group site to encourage appropriate member behavior. Similarly, the welcome message for new members highlights the r/VSL goals and directs them to the rules to improve affirmative commitment and regulate behavior (Kraut et al., 2016). The choice to maintain the group open to the public, as opposed to private membership, is to encourage all teachers to find and access resources that might be helpful easily. This will lead to greater access to resources for potential participants that are active members of similar, less-focused teacher groups.

As membership grows, subgroups and additional moderators will aid in developing the group. The r/VSL group will actively recruit new members by collaborating with similar interest groups, like science teacher groups, and allowing members to share resources with their peers. While the membership grows, active members will be asked to become moderators and help monitor the discussions within the group. Ultimately, to prevent disengagement from a growing membership with a diverse background, the r/VSL will be divided into subgroups based on the science content area to retain members engaged in relevant content (Kraut et al., 2016). While members can post directly to the subgroup through tags, all members can easily see and participate within the subgroups within the primary r/VSL group site.

The r/VSL fills a unique gap in the online communities available. Most online sites and groups only provide resources on virtual labs and general science teaching practices, as seen in a previous report (Perez-Flores, 2022). The sites dedicated to virtual labs give resources on the different virtual lab platforms or pre-made lesson plans. Other online communities that allow members to interact are focused on teaching resources or general science topics. The r/VSL provides a location, the online environment, for members to share resources and obtain help for collaborative growth in their instructional practices. Thus, creating a digital habitat for science teachers to interact and master virtual lab teaching practices together (Wenger, 2012).

The framework and features in the Reddit platform highlight member communication and collaboration within its various subgroups. Members can ask questions and share resources within the r/VSL group and outside the group. The technology in their search features allows non-members to quickly find answers to their inquiries in a group, join it if they want, and potentially become active community members. Members are the core of the r/VSL community, as they will collaborate by asking questions, answering questions, and sharing resources.

The inter-connectedness between groups in the educational field is crucial because teachers usually work in isolation within their classrooms, and many of them teach different subject areas. On Reddit, non-members can also collaborate with the r/VSL group since many science teaching practices are general instructional techniques. Members from similar teaching groups can answer questions if they show up on their feed. Ultimately, the modeled collaboration structure and the norms set for the community will allow for a seamless and constructive relationship between member-to-member and member-to-nonmember communication. The r/VSL aims to be a valuable environment for educators of science courses to share and learn together.

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