INPLASY PROTOCOL

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None declared.

Design, implementation and evaluation of Online Discussion Forums in undergraduate studies: Protocol for a systematic review

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Review question / Objective: **How are Online Discussion Forums (ODFs) designed, implemented and/or evaluated in undergraduate studies?**
Condition being studied: **We are interested in studying how ODFs are designed, implemented and evaluated in undergraduate studies. Design aspects include the forums' structuring, configuration and purpose. Several platforms are readily available for setting up an ODF, although some, such as Moodle, are more common than others (da Silva et al., 2019; Naranjo et al., 2012). Social networks also offer a functional ODF environment (Al-Dheleai et al., 2020; Dommett, 2019). ODF is generally conducted with a group of students in order to achieve certain learning outcomes in a limited amount of time, ranging from 4 (Han et al., 2020) to 14 weeks (Yücel & Usluel, 2016) of asynchronous discussion. A review of the research published over the last few years is needed in order to collate information about the frameworks, teacher roles and timeframes used to attain the learning outcomes. Group sizes and compositions are also relevant aspects in this regard (Chen & Liu, 2020; Yang et al., 2020). ODF evaluation requires the measurable definition of learning outcomes and procedures for analysing them. New constructs are emerging, such as student leadership (Bleich, 2020), while network analysis (Rolim et al., 2019; Saqr et al., 2020) and text mining (Wang et al., 2019) are improving the understanding of ODFs.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 09 June 2021 and was last updated on 09 June 2021 (registration number INPLASY202160029).

INTRODUCTION

Review question / Objective: **How are Online Discussion Forums (ODFs) designed, implemented and/or evaluated in undergraduate studies?**

Rationale: ODFs constitute an important educational resource for the development of learning communities at universities, providing students with the possibility to actively engage in their learning process and build knowledge through online interaction. Several review studies have highlighted significant advances in the design and implementation of ODFs with undergraduate students (Gao et al., 2013; Thomas, 2013), as well as assessing the effectiveness of Online Discussion strategies in general (Almatrafi & Johri, 2019; Darabi et al., 2013; Klisc, 2015). Despite the growing interest, there is still a lack of comprehensive research on the design, implementation and evaluation of this methodology at undergraduate level. Regarding ODF design, there is a need to identify and summarize such aspects as how ODFs are designed according to teaching method (e.g. face-to-face, blended or hybrid), and whether participants have received specific ODF training. As for implementation, it would be interesting to examine the reporting of key attributes of the implemented activities and advances in e-moderation. Concerning the evaluation of ODFs, new visualisation techniques have contributed to the analysis, classification and modelling of discussion topics (Zhao et al., 2019) and to discourse and learning analysis (Onyema et al., 2019; Wang et al., 2019). For example, Social Network Analysis (SNA) has offered a novel framework for evaluating ODFs (da Silva et al., 2019; Saqr et al., 2020) and aspects such as the students' social and cognitive presence (Rolim et al., 2019), which seems to improve course discussion interactivity (Al-Dheleai et al., 2020), beyond mere socialising. It would be, furthermore, interesting to explore alternatives, considering more specific and accurate learning outcomes. Finally, the research may have useful implications for various forms of computer-supported collaborative learning.

Condition being studied: We are interested in studying how ODFs are designed, implemented and evaluated in undergraduate studies. Design aspects include the forums' structuring, configuration and purpose. Several platforms are readily available for setting up an ODF, although some, such as Moodle, are more common than others (da Silva et al., 2019; Naranjo et al., 2012). Social networks also offer a functional ODF environment (Al-Dheleai et al., 2020; Dommett, 2019). ODF is generally conducted with a group of students in order to achieve certain learning outcomes in a limited amount of time, ranging from 4 (Han et al., 2020) to 14 weeks (Yücel & Usluel, 2016) of asynchronous discussion. A review of the research published over the last few years is needed in order to collate information about the frameworks, teacher roles and timeframes used to attain the learning outcomes. Group sizes and compositions are also relevant aspects in this regard (Chen & Liu, 2020; Yang et al., 2020). ODF evaluation requires the measurable definition of learning outcomes and procedures for analysing them. New constructs are emerging, such as student leadership (Bleich, 2020), while network analysis (Rolim et al., 2019; Saqr et al., 2020) and text mining (Wang et al., 2019) are improving the understanding of ODFs.

METHODS

Search strategy: The search strategy will follow the 'Peer Review of Electronic Search Strategies' (PRESS) guideline. Referring to 'Online Discussion Forums', the following terms will be used as descriptors: online discussion forum, online discussion group, online discussion, online forum, asynchronous online discussion, and internet forum. Referring to 'Undergraduate Studies', we will use: bachelor degree, bachelor program*, bachelor stud*, college, undergraduate*, higher education, postsecondary, tertiary education, tertiary institution, third level education, and Universit*. We will use the combination of Mesh words and free words to conduct the literature search. Terms within and across concepts will be combined using the Boolean operators OR and AND respectively. A draft search strategy will be modified according to the specifics of each database.

Participant or population: Undergraduate students from all disciplines, regardless of country, and geographical origin.

Intervention: Studies that design, implement, and/or evaluate ODF as an educational tool in undergraduate studies.

Comparator: None.

Study designs to be included: This review will consider all primary studies, including empirical studies with experimental (randomized and non-randomized), non-experimental (e.g. cross-sectional, longitudinal studies), single-case and qualitative designs.

Eligibility criteria: In accordance with the review question, the following inclusion and exclusion criteria will be considered. Article inclusion criteria: a) Empirical studies; b) Studies that design, implement, and/or evaluate asynchronous ODFs in undergraduate courses; c) Studies published in English, French, and Spanish. Article exclusion criteria: a) Theoretical studies; b) Systematic or non-systematic literature reviews; c) Meta-analyses; d) Non-educational interventions; e) Studies with mixed samples [students of different educational levels], unless the samples are segmented; and f) Studies about synchronous online discussions.

Information sources: We will systematically search Scopus, ISI Web of Science (WoS CORE Collection), Psychological Information (PsycINFO), and the Education Resources Information Center (Eric). In order to provide a more comprehensive review, a 'grey literature' search will be carried out using the Google and Google Scholar search engines using the search terms indicated above. Weekly alerts will be programmed for new research in the aforementioned databases. The reference lists of relevant empirical articles and reviews will be also checked to identify other potentially eligible studies.

Main outcome(s): Identification and description of the main design and implementation characteristics of ODFs used in undergraduate studies: field of knowledge, country, design, sample population, data analysis, research purpose, specific instructor training, specific student training, course, educational setting, administration procedures, learning and teaching theories, main forum purpose, advances in e-moderation, teacher boundary forecast, student boundary forecast, software, scheduling, forum type, timeframe, and forum size. Identification and description of procedures to evaluate ODFs in undergraduate studies: tools (e.g. assignment of marks or tests, software for content analysis), usage, learning metrics, and assessors.

Additional outcome(s): None.

Data management: Two authors will independently review the title and abstract of each study retrieved from the search in order to determine eligibility for inclusion. When decisions cannot be made from the title and abstract alone, the full paper will be retrieved. Selected studies will be subjected to a full-text analysis by both reviewers. The corresponding authors will be contacted by e-mail and/or ResearchGate in order to request hard-to-access full texts or to gather additional information on the studies. Disagreements will be solved via review by a third author or by consensus. b. The data obtained will be organized and summarized by both reviewers. c. A third author will perform quality control of the data with a random selection (25%). Selected and excluded articles will be reported. d. Tables and figures will be produced to show the included studies and outcomes. e. The retrieved references will be managed using the citations manager Mendeley Desktop v1.19.6, and duplicates removed.

Quality assessment / Risk of bias analysis: To maximize the reporting quality of the systematic review, we will follow the Preferred Reporting Items for Systematic Reviews and Meta-analysis framework for systematic reviews protocols, PRISMA-P (Moher et al. 2015; Shamseer et al., 2015). This will be used to assess the reporting

quality of our systematic review. Primary studies risk of bias will be critically appraised by two authors independently, and any disagreement will be discussed and solved by consensus decision with a third author. The risk of bias will be assessed using a tool created by adapting and combining the RTI Item Bank (RTI-IB) (Viswanathan & Berkman, 2012) for observational studies, the ROBINS-I tool (Sterne et al., 2016) for comparative interventions, and the NICE tool (National Institute of Health and Care Excellence, 2012) for qualitative studies.

Strategy of data synthesis: The extracted data will include the categories indicated in the main outcomes. We will conduct a narrative synthesis of the characteristics of the design, implementation, and/or evaluation of ODFs in undergraduate studies in order to achieve the research objectives.

Subgroup analysis: We will perform a subgroup analysis depending on the findings.

Sensitivity analysis: We will not perform a sensibility analysis.

Country(ies) involved: Spain and Mexico.

Other relevant information: None.

Keywords: Systematic review; Online discussion forum; Asynchronous online discussion; Undergraduate; Computer-supported collaborative learning.

Dissemination plans: This systematic review is intended to be published in a peer-review journal and presented at relevant academic conferences.

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