Extracurricular activity based on undergraduates – postgraduates peer learning to promote student's academic research skills in developing countries higher education: experiences form Syria

Hatahet, T., Alkhaledi, A., Tello, A., Jarad, L., Al Shihabi, A., & Campbell, K. (2023). Extracurricular activity based on undergraduates – postgraduates peer learning to promote student's academic research skills in developing countries higher education: experiences form Syria. *Educational Research and Evaluation*, 1-18. Advance online publication. https://doi.org/10.1080/13803611.2023.2259872

Link to publication record in Ulster University Research Portal

Publication Status:
Published online: 20/09/2023

DOI:
10.1080/13803611.2023.2259872

Document Version
Publisher's PDF, also known as Version of record

General rights
Copyright for the publications made accessible via Ulster University's Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy
The Research Portal is Ulster University's institutional repository that provides access to Ulster's research outputs. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact pure-support@ulster.ac.uk.

Download date: 20/10/2023

Routledge
Taylor & Francis Group

Educational Research and Evaluation

An International Journal on Theory and Practice

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/nere20

Extracurricular activity based on undergraduates – postgraduates peer learning to promote student's academic research skills in developing countries higher education: experiences form Syria

Taher Hatahet, Ahmad Alkhaledi, Aya Tello, Lana Jarad, Ahmad Al Shihabi & Kate Campbell

To cite this article: Taher Hatahet, Ahmad Alkhaledi, Aya Tello, Lana Jarad, Ahmad Al Shihabi & Kate Campbell (20 Sep 2023): Extracurricular activity based on undergraduates – postgraduates peer learning to promote student's academic research skills in developing countries higher education: experiences form Syria, Educational Research and Evaluation, DOI: 10.1080/13803611.2023.2259872

To link to this article: https://doi.org/10.1080/13803611.2023.2259872

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

View supplementary material

Published online: 20 Sep 2023.

Submit your article to this journal

Article views: 152

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=nere20

EDUCATIONAL RESEARCH AND EVALUATION
https://doi.org/10.1080/13803611.2023.2259872

Routledge
Taylor & Francis Group

OPEN ACCESS Check for updates

Extracurricular activity based on undergraduates – postgraduates peer learning to promote student's academic research skills in developing countries higher education: experiences form Syria

Taher Hatahet [a,b]*, Ahmad Alkhaledi[c]*, Aya Tello[d], Lana Jarad[e], Ahmad Al Shihabi[e,f] and Kate Campbell[g]

[a]School of Pharmacy, Queens University Belfast, Belfast, UK; [b]China Medical University and Queen's University Joint College, Shenyang, People's Republic of China; [c]Faculty of Medicine, Oncology Resident, Al-Bairouni University Hospital, Damascus University, Damascus, Syria; [d]Faculty of Information Technology Engineering, Artificial Intelligence and Natural Language Processing Department, Damascus University, Damascus, Syria; [e]Faculty of Medicine, Damascus University, Damascus, Syria; [f]Department of Pathology, University of California Los Angeles, Los Angeles, CA, USA; [g]School of Applied Social and Policy Sciences, University of Ulster, Belfast, UK

ABSTRACT

Higher education in the developing world is challenged by high number of students and rigid curricula. These challenges require innovative ways to support students learning. In this paper, a new extracurricular activity was designed to promote academic research and self-learning skills using undergraduate – postgraduate peer learning. The course aims to fill the gap in active learning in the developing world. The newly designed course was delivered to 20 students from different fields of studies in Syria. Each group was mentored by a postgraduate student and supervised by an academic. Students provided positive feedback on the course design, aims and skills development. Comparison of students' academic research skills was performed through pre- and post-course evaluation. Significant improvement in literature search skills was observed ($p < 0.05$). The proposed course can be replicated in other developing countries creating an educational opportunity for research and self-learning skills among students at different grades of studies.

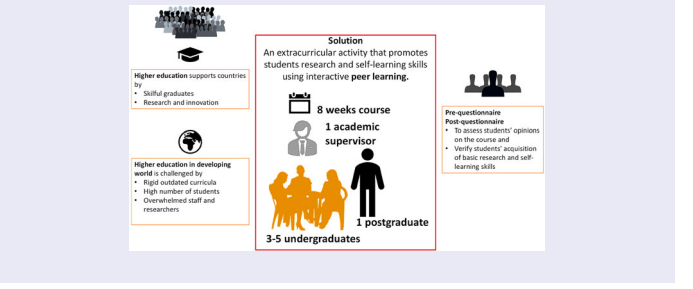
ARTICLE HISTORY
Received 8 March 2022
Accepted 13 September 2023

KEYWORDS
Peer learning; self-learning; academic research skills; developing world; Syria

CONTACT Taher Hatahet t.hatahet@qub.ac.uk
*Equal contribution.

Supplemental data for this article can be accessed online at https://doi.org/10.1080/13803611.2023.2259872

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.



1. Introduction

1.1. Higher education in Syria

In developed countries during the growth phase at the national level, the role of higher education (HE) has shifted from simply educating future generations to conducting research that sustains the national development agenda (Society, 2000). Recently, this role has further been expanded to the regional level where HE is involved in economic growth and employment, for example in the European Union (Arbo & Benneworth, 2007; Keeling, 2006). The new frontier for HE requires visionary plans set by policymakers and governments that take into account as many variables as possible and avoid unintended consequences (Krücken, 2014). In Syria, even before 2011, the HE sector was mainly driven by public universities. While public universities in Syria have expanded, the population growth outraced this expansion (Kabbani & Salloum, 2010). The opening of private universities taking place after the "University Regulation Law" of 2001 (Ayoubi et al., 2009) aimed to support the nation with wider opportunities to reach HE. However, there is evidence that some of these new institutions were more focussed towards fulfilling a new business opportunity in the country rather than satisfying an educational or social role (Tozan, 2023). The number of available HE programmes has lagged behind the needs of the society and the job market dynamics (Bahnassi, 2020). In summary, the period before the crisis in Syria can be highlighted by an increase in the quantity rather than the quality of the HE graduates in the country.

In 2011, the Syrian conflict erupted with huge destruction to the country's economy and society. The conflict affected all aspects of life with people fleeing from war zones, the deterioration of healthcare facilities and damage to the HE sector (Cheung et al., 2020; Milton, 2019). During the crisis, the HE system continued to function with the basic minimum education delivered in public universities. The private institutions were forced to relocate to more secure geographic areas within Syria (Alibrahim, 2016). Even though the HE system did not collapse, it was dramatically impacted by the conflict facing challenges, such as lack of funding, the loss of qualified staff and severe increased pressure on the public universities in the more secure and safer areas as an increasing number of displaced students sought fewer available places.

Furthermore, the conflict was used as an excuse to tighten constrains on academics to perform teaching and research within university doors (Milton, 2019; Mouzahem, 2014; Tigau, 2019; Tozan, 2023; Yahia, 2011). These challenges, exaggerated by the crisis, crippled the HE sectors in Syria limiting its ability to be an active stakeholder in reshaping the country's future. Consequently, an urgent need for innovative solutions is required. Solutions that could be from outside the university, more through students themselves, such as using peer learning (PL) in capacity building extracurricular courses. Academic centres can further support students in extracurricular environments that can be run in parallel to university curricula with less bureaucratic constraints.

These extracurricular activities can be designed towards building knowledge skillsets, such as "soft" and even vocational skills. A crucial skill that could benefit Syrian students is the ability to self-learn and study (Silén & Uhlin, 2008). Self-learning and study is the skill where the students take command of their own learning, driving, processing and growing their knowledge base without direct assistance from a teacher in a classroom, but through a self-developed skill of identifying the information needed and the act of searching it out through self-study or experience and outside of a formal education setting (Zimmerman, 1990). This can happen through the appropriate understanding of the sources of new knowledge, i.e., from academic research. Students in Syria should not only be capable of finding sources of knowledge but also competent in conducting relevant research with this knowledge. Through these means, Syrian students will not only be self and lifelong learners, but also become active builders of the country's post conflict reconstruction. The importance of academic research becomes more evident as Syria is ranked 13 out of 16 middle eastern countries in number of published articles published in PubMed in 2005 compared to over 450 articles coming from Jordan, a neighbour country, which is ranked 6th (Benamer & Bakoush, 2009).

The extracurricular programme aims to develop self-study skills that will be further applied to develop research skills. These academic research skills begin from an understanding and appreciation of the importance of robust research to practical skills associated with initiating and completing a literature review, formulating a research question following appropriate steps of conducting a valid methodology to address the research question, able to disseminate and analyse the outcomes in a robust form and peer review the final research output (Supplementary Table 1)

1.2. The role of PL in skills development:

PL, or peer teaching, or peer mentorsing, is an informal way to instruct students from similar social groups, where the tutor is not a professional teacher but rather a peer. Research demonstrates beneficial outcomes for both teachers when delivering information, and for students when developing practical skills (Burgess &

Nestel, 2014; Friel et al., 2018). This cooperative learning method was supported by John Dewey in the late nineteenth century against the traditional way of learning (Martin & Edwards, 1998; Sharan & Sharan, 1992). It is considered a useful tool for learners and teachers as it enhances skills, that may not be obtained from official curricula, such as self-confidence and communication skills for peers, teaching and leadership skills for those students who take the role of facilitators (Ali et al., 2015; Burgess et al., 2014; Gamlath, 2022; Gottlieb et al., 2017; Ten Cate & Durning, 2007; Topping, 1996). PL helps students to share their weaknesses with their peers rather than to the official educational staff. This allows students to address the problem by explaining difficult information more simply without the fear of asking questions about the subject (Bulte et al., 2007; Hall et al., 2014; Zijdenbos et al., 2010). Vygotsky explained that learning is a social practice that takes place in the zone of proximal development through interaction with "most knowledgeable others", a process named scaffolding (Sanders & Welk, 2005). This process, if happening with more experienced peers, offers an appropriate place for students learning and development in their safety zone (Haider & Yasmin, 2015). Even in online scenarios, Sabouni et al. (2017) found that peer education in online courses could be efficient in comparison to traditional expert courses when teaching evidence-based medicine (EBM). Furthermore, Widyahening et al. (2019) noticed that students achieved better results in skills of EBM critical appraisal when educated by their peers versus those educated by medical faculty teachers (Widyahening et al., 2019).

Looking into the HE situation in Syria that is over-pressurised with huge number of students and limited advancement in the educational services, PL can be a proficient method in enhancing the overall learning experience (Burgess et al., 2014). Engagement of students in PL can be a beneficial way to appropriately address the increased number of students in medical and non-medical fields (Burgess et al., 2014; O'Kelly et al., 2015). Again, due to the limitation of resources, embedding PL in HE curricula in Syria will be challenging, thus designing the PL environment as an extracurricular activity may be more achievable. Buckley et al. found that extracurricular activities could have adverse effects on the academic performance of students if time was not well managed. Others found that students developed their "soft" skills such as team working, problem solving and time management with further involvement in new extracurricular activities. Participants in Buckley's study observed an overall reduced stress and enhanced health when taking part in such activities (Buckley & Lee, 2021). PL can have several applications in Syria. Taking the example of teaching EBM in the medical field, as EBM is considered a priority for health care students (Sabouni et al., 2017). Despite its importance, in 2012 Alahdab et al. mentioned several factors that impede EBM awareness in Syria, such as lack of EBM curricula in addition to lack of technological devices and software, also the absence of medical journals subscriptions (Alahdab et al., 2012). However, missing medical research and information may well be solved by PL methods.

1.3. The educational activity:

Although carrying out research in Syria is difficult, especially when it comes to sensitive topics (Buckner, 2013), we designed a PL-based research course for postgraduate (PG) and undergraduate (UG) students from different fields of study. This course was aimed at UG and depended on a PG peer for facilitating the sessions under supervision of an academic staff member (the most knowledgeable others). The course directly applies the taught skills to a research project relevant to Syria. PL was facilitated among students through the role of PG as group leader and facilitator of the learning process. In turn they (PG) functioned as a bridge between the academic staff and the UG students. Each week, academic staff requested the completion of a homework task, for example Reading papers about specific topic for the following week where the PG supports the UG with the task by guiding them to appropriate search engines, use of correct key words, significant texts, etc. and where support can be delivered individually or in a group. The course was delivered to group of students in medicine, pharmacy, information technology and economics. The course (Supplementary Table 1) was designed by the authors with the aim of

1) providing a model for future extracurricular activities that can be run in Syria by academics and students and can have positive impact on students' self-study skills.
2) examining the selected students' perception of the designed course and the way it was delivered using PL.
3) assessing the impact of this course on selected students' academic research ability.

2. Methodology

2.1. Study design:

In this cross-sectional study, a tailor-made course was designed to empower UG awareness of academic research through an 8-week programme (Supplementary Table 1). The course involved a group of 3–5 UG students with 1 PG student as a facilitator and was supervised by an academic staff member (AS). Five groups in total were enrolled in the course making a total of 20 UGs, 5 PGs and 5 AS. The academic staff developed the research question that was applied throughout the course and aimed to be a possible academic research output or publication by students at the end of the course. Ahead of each weekly session, the PG will discuss the delivery plan with the AS seeking advice and guidance, then the PG will run the actual session and lead the discussion. A survey to measure the students' awareness about academic research was designed and presented to students at the beginning and at the end of the course. The design of the course aims to bring PL among UG students with

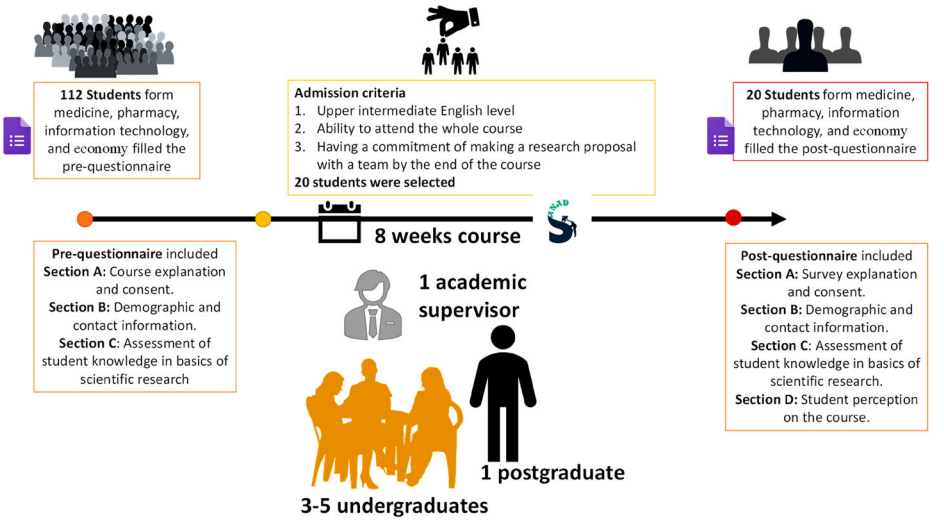


Figure 1. Schematic representation of the chronological order of events in the study design and data collection.

mentorship from PG students and supervision by AS all in one place to promote students learning and development (Doolittle, 1997). Figure 1 illustrates the study design in chronological order.

2.2. Course design

The course involved eight sessions in which students were able to discuss research-related topics in small working groups. The sessions covered the importance of conducting research, creating research question, reading research articles, dealing with research databases, several types of research articles, critical appraisal of research articles, academic writing and finally, presenting research proposals in an academic way (Supplementary Table 1 and Figure 1). At the end of each session, there was homework for students to embed what they had learned. The aim was to enable students to produce and conduct a research proposal related to their specialty. The course took place form October 2020 at Sanad Team for Development (STD) halls in Damascus, Syria for eight consecutive weeks. The learning outcomes from each week of the 8-week programme are provided in Supplementary Table 1.

2.3. Data collection

Two surveys were circulated, one at the beginning of the course and one on completion of the course (Figure 1). The first questionnaire was designed for students to apply for the course and contained three sections:

Section A involved an introduction and explanation about the course, with consent for participation and taking part in the subsequent questionnaire in two questions.

Section B involved seven demographic and contact information questions.

Section C examined the students' knowledge about research in general, literature search engines, types of academic articles, parts of academic research articles and peer review process with seventeen questions. This section aimed to investigate what students thought about the importance of research and how they would benefit from this workshop using open-ended questions.

The second survey had four sections:

Section A description of the survey, its intended purpose and participation consent.

Section B involved nine demographic and contact information questions.

Section C was identical to section C from the pre survey and aimed to measure the progress in the student's awareness of academic research with the possibility to complete pre- and post-group comparisons in thirteen questions.

Section D contained 10 questions to gather student's perception on the course designed as Likert questions.

Data were collected using online questionnaire (Supplementary data Appendix 1) using Google forms (Google, USA) to offer convenience and accessibility for students during the COVID-19 pandemic. Collected data were filtered and organized using Excel (Microsoft, USA). Finally, data were put in charts and tables and analysed using Statistical Package for the Social Sciences (SPSS) (Intel, USA). Likert questions in the survey were evaluated for internal reliability using alpha Cronbach's. Arabic was used only for demographic data, all the data presented in this article were collected through the English section of the survey. Open-ended questions were answered in English by participants to avoid the need for translation and interpretation by investigators. Gathered answers were independently categorized into themes by two authors, categories were then matched. In case of mismatching, a third author engaged in discussion. Finally, one or two examples were picked depending on the frequency of mentioned theme by participants.

2.4. Study participants

Students and graduates from medicine, pharmacy, information technology and economics were included in the pre-questionnaire (first survey), and those who were chosen for the course were included in the post-questionnaire (second survey). In total, 112 students filled the pre-questionnaire, and 20 students were chosen to attend the course and complete the second survey. The research focused on the UGs cohort of students in terms of perspective about the course, developed skills and role of PL process.

Admission criteria were upper intermediate English level, ability to attend the whole course and having a commitment of completing a research proposal with a team by the end of the course (Figure 1).

Consent for participation in the surveys and the possibility for the authors to publish the results anonymously was obtained from the participants in both the pre- and post-questionnaires.

2.5. Statistical analysis

An ID was given to each response from the questionnaires and was recorded using Microsoft Excel, where marks for every question was given by authors on questions that requested a correct answer. Marking was done with negative marking to enable a better identification of subtle differences in students' pre- and post-course performance. Negative marking was set to give +1 or −1 for each correct or incorrect answer, respectively. Data were then analysed using SPSS. Appropriate statistical tests were conducted with significance set *a priori* at $p < 0.05$. Mean, mode, standard deviation and frequency statistics were used for perception and Likert questions, while paired Student T test was used to identify significant differences in students understanding of academic research through questions that requested correct answers.

2.6. Data storage:

All collected data were stored online and permissions were only given to authors of this article. Processed data were stored anonymously on password-protected computers with encrypted hard drives and only made accessible to authors of this work.

3. Results

3.1. Demographic data

Table 1 presents the demographic information of students who filled the pre- and post-course questionnaires. The majority of the students were from medicine and IT as these fields of knowledge were more accessible to authors than others. The course took place with five groups, one from each "field" except medicine with two groups of four students. Gender equity was met in the total number of selected students across the whole course but not within each group with 10 students from each gender.

Table 1. Demographic information of participants in the PL process (undergraduate students).

	Medicine	Pharmacy	Information technology	Economics	Total frequency (percentage)
	The pre course questionnaire				
Total	77 (69%)	7 (6%)	22 (20%)	6 (5%)	112 (100%)
	The post-course questionnaire				
Female	2 (10%)	3 (15%)	2 (10%)	3 (15%)	10 (50%)
Male	6 (30%)	1 (5%)	3 (15%)	0 (0%)	10 (50%)
Total	8 (40%)	4 (20%)	5 (25%)	3 (15%)	20 (100%)

Table 2. Student's perception towards the academic research skills and self esteem after the PL process using Likert scale questions where, 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

Questions "This method of teaching makes me—–"	Mode Mean ± STD
Academic research skills	
more aware of the importance of doing research in my field of study	5 4.60 ± 0.76
makes me more confident about how to create a research question in my field	5 4.40 ± 0.76
this method of teaching is useful to learn material to conduct research relating my degree.	5 4.40 ± 0.76
encouraged me to read more research articles during my studies	5 4.20 ± 0.95
makes me more confident about how to create a research methodology in my field	4 4.05 ± 0.89
makes me more confident about how to analyse and present research data in my field	4 3.55 ± 0.95
Critical analysis and communication skills	
more confident about how to look critically into published research in my field	4 4.15 ± 0.75
more confident about how to discuss research findings in a scientific way in my field	4 4.15 ± 1.04

Note: Data are presented by mode.

3.2. Student perception on their academic research skills

Upon course completion, students were surveyed for their perception on the course and results are presented in Table 2. Alpha Cronbach's was 0.88 for the Likert question section of the questionnaire indicating a good internal reliability. Regarding the academic research skills that the students developed in the course, the majority of students strongly agreed (Mode = 5) that this course made them aware of the importance of doing research, being able to formulate a research question and being more encouraged to read literature. Also, students agreed that the course made them more confident while creating a research methodology or analysing and presenting research output (Mode = 4). On the personal development side, students agreed that the course improved their critical analysis and communication skills in relation to academic research with a mean of 4.15 out of 5.

More than half of the students reported that they had benefited in terms of developing self-study skills and the ability to influence and build rapport with others. Almost half of the students also reported that their decision making and problem-solving skills had improved during the course (Figure 2). Other developed skills coming from the open-ended questions, five students reported skills that can be gathered around team working (Table 3).

Table 4 shows examples of positive and negative comments about the course gathered through open-ended questions. On the positive side, 20% of students appreciated the role of the facilitator in keeping the interaction going which was successful due to the appropriate team size. Only 10% of students talked about interaction with other fields during the course and this benefiting networking among students. On the negative side, five students complained

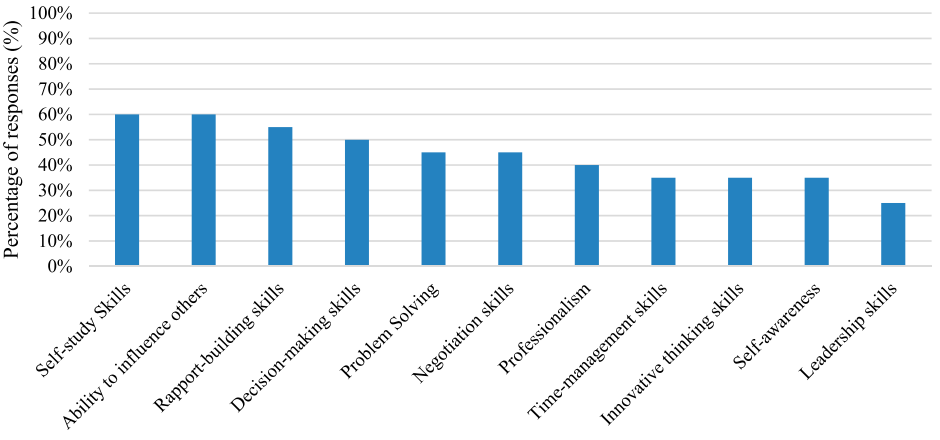


Figure 2. Student's perception on skills improved and/or developed during the PL process ($N = 20$).

Table 3. Student's perception on extra skills improved and/or developed during Peer learning process.

Frequency (Percentage)	Team working	Using PowerPoint
Female	1 (5%)	1 (5%)
Male	4 (20%)	2 (10%)
Specialty (Frequency)	Medicine (4) and information technology (1)	Medicine (2) and economy (1)

Notes: Additional skills were collected from open-ended questions and similar key words were grouped together.

about unexpected delays in holding up the sessions. Three students complained about the absence of a full plan for the session from the beginning of course, and the knowledge difference among team members.

3.3. Comparison between student's understanding of academic research skills before and after taking the course

Both surveys contained a list of key questions that enable the tracking of students understanding of basic academic research skills (Table 5). The answers for these questions were compared pre- and post-course for selected students. Students improved their average score in most of the questions with statistical differences in literature review skills (searching literature and judging papers quality) with $p < 0.05$. Other areas were improved without statistical differences. Two areas showed a lower average in post- than pre-course but without statistical differences and included selecting current resources in respective fields and the process of academic peer revision in publication.

4. Discussion

HE has a noticeable valuable role in the development of nations and societies. It provides the nation with skilled graduates that boost the development and

Table 4. Examples of students' positive and negative comments towards peer learning process.

Positive feedback received from the students		Total number of students frequency (percentage)
Role of facilitator		
The interactive presentation of information during the sessions with the focus on practicality rather than simple theoretical concepts.	*"Our facilitator was the best in this project, her sessions were very practical and relied on asking questions and brainstorming, she let us work with our hands."*	4 (20%)
	"I liked getting out of the theoretical presentation of information and working collectively"	
Encouraging the initiation of scientific research	*"I have benefited greatly through learning the right steps to get to the start-up phase of writing research"*	3 (15%)
Team dynamic		
The small number of individuals within a team	*"The small number of each group was very excellent, and each had an opportunity to participate and interact with each session"*	4 (20%)
	"The number was very perfect, and everyone was able to ask questions and listen to the other questions and discuss them, so the sessions were very effective"	
The interdisciplinary nature of the peer learning process		
Making relationships with researchers from other Specialization and variety of specializations	*"The variety of specializations was a good point"*	2 (10%)
Negative feedback received from the students		
Learning commitment		
Lack of commitment of course dates	*"The delay of sessions repeated several times"*	5 (25%)
	"Failure to comply with the assumed time to end the session"	
Absence of a clear plan for all sessions since the start of the session	*"The titles of the sessions were not clear to us"*	3 (15%)
	"Not showing a complete plan for the program that will be followed, for example, we should have known the content of each session from the first day"	
Team dynamic		
Unequal level of students within a team	*"All students in my team have experience and attended many courses in the research field and they have worked on research projects. For me, I was so weak in this field that I did not understand many terms and I did not want to interfere in the discussion"*	1 (5%)
Missing Content		
The method of creating a questionnaire is not covered	*"I suggest adding a session on how to search for a questionnaire or how to design one and approach the validity of it because I expect three-quarters of all beginners depend on the questionnaire as a measurement tool"*	2 (10%)

Notes: The percentages represent the number of students that mentioned the topic described in the first column.

resources of the country. The role cannot be accurately performed unless that HE education has sufficient governmental and non-governmental support. In Syria and especially the crisis in 2011, the HE sector has been impacted by war, displacement, turmoil, brain drain along with a rigid societal environment that does not facilitate the improvement and upgrade of the curriculum and assessment processes (Tozan, 2023). Furthermore, the immense number of students relative to funding available in public universities along with business-oriented and relatively expensive private universities paralysed HE in Syria (Al-

Table 5. Assessment of students understanding of academic research concepts and basics before and after the workshop.

Question	Selected applicants before workshop (Mean mark)	Selected applicants after workshop (Mean mark)
If I need to find an accurate and up-to-date information related to my field of study, I usually search?	0.80 (SD: 1.47)	1.40 (SD: 1.314) ***p* < 0.05**
When you select information from literature, you judge the quality of articles by?	1.65 (SD: 1.18)	2.20 (SD: 0.77) ***p* < 0.05**
When I screen several articles to read, I pick the articles based on?	−0.4 (SD: 0.68)	0.3 (SD: 0.73) ***p* < 0.05**
Peer revision of academic research is designed to (…) of published research	2.7 (SD: 0.7)	3.0 (SD: 0) $p > 0.05$
Academic articles can be, pick the ones you know?	3.5 (SD: 1.28)	3.8 (SD: 0.95) $p > 0.05$
Which of the following is not an essential part of academic research article, Pick more than one option?	1.35 (SD: 1.53)	1.45 (SD: 1.5) $p > 0.05$
When I select an article to use for my work, I usual read?	3.35 (SD: 0.87)	3.60 (SD: 0.94) $p > 0.05$
If I need to find an accurate and up-to-date information related to my field of study, I usually read?	0.55 (SD: 0.94)	0.40 (SD: 0.68) $p > 0.05$
Peer-reviewed articles mean that the article was done (…) before being published	0.40 (SD: 0.94)	0.20 (SD: 1) $p > 0.05$

Notes: Selected students' performance after the workshop was compared to their performance before the workshop ($N = 20$). Student T test was used for determining the mean value of answers and p value, results were regarded significantly different when $p < 0.05$.

Fattal & Ayoubi, 2013; Alibrahim, 2016; Ayoubi et al., 2009; Kabbani & Salloum, 2010; Milton, 2019). These formidable obstacles need innovative solutions in order to support future generations learning in complementary ways to the official university curriculum. An effective way could be achieved through extracurricular activities. The designed extracurricular activity focused on supporting and teaching students academic research skills through being an active self-learner, to becoming a skilled researcher that planned research questions and had the skills to benefit their country's needs.

The academic research course was designed to be a team-based learning using UG peers and more knowledgeable others, according to Vygotsky, who are PG facilitators and AS (Sanders & Welk, 2005). This course has a wide scope that is applicable to all fields of study where the formulated research question was around Syrian's current needs. The course enrolled 20 students from four different fields in a gender-balanced manner (Table 1). Upon completion of the course students strongly agreed (Mode = 5) on importance of doing research, formulating the correct research questions, steps in performing research and reading literature (Table 2). These skills are ones that build the notion of self-learners that are aware of the role of research in changing society (Etzkowitz, 1990; Sharma, 2020; Tekkol & Demirel, 2018). Devi et al. (2010) reported that the "Mentored Student Projects" programme not only increased students' research skills as evident from their perceptions but was also successful in fostering a positive attitude towards academic research

(Devi et al., 2010). Furthermore, students agreed (Mode = 4) on the course usefulness in conducting, presenting, analysing and discussing research skills. The fewer positive comments towards these skills could be comprehended by the fact that undergraduate students are still in the early learning phase. This is similar to the observation by Murdoch-Eaton et al. (2010), where critical analysis and research methods skills were the least identified as development areas by medical undergraduates from five different universities in the UK.

Twelve students reported the development of self-learning skill, which is one of the main aims of this course (Figure 2). In parallel, the ability to influence others was also among the top reported skill by 60% of students (Figure 2). This indicates that the course was successful in the development of communication skills and self-confidence among students working in groups that fits with the concept of social congruence described by Ten Cate and Durning (2007). Other skills, such as rapport building, decision making and problem-solving skills, were reported by half of students, which can be explained by the positive role of the PG facilitator as a teacher. This was also captured in the open-ended questions in Table 4, where students positively mentioned the encouragement and practicality-oriented interaction with peers and facilitator. The facilitator is also getting the benefit as teaching is learning twice according to Joseph Joubert, the French philosopher of the eighteenth century (Whitman & Fife, 1988). Taking a teaching role about academic research can be very helpful for students enrolled in masters and PhDs, who will be researchers of the future.

In the aim of getting an overall assessment of the course design, positive and negative feedback were collected from students in open-ended questions (Table 4). The interactive nature of the course, with either the facilitator or the peers, was the main positive feedback. This can be explained by the small group size (3–5 students) (Table 1) and the nature of the PL process (Burgess et al., 2014). Some students highlighted that it might be useful to merge teams from different fields of study in future courses, this may well be an opportunity for interdisciplinary collaboration. There are some points that could be rectified in subsequent workshops around dates of the course which were not easily confirmed due to the COVID-19 pandemic. Another learning point would be to have a clear plan for all sessions from the beginning of the course, for example providing a brief summary of the 8-week programme with aims for each week. Adding a second session on the topic of creating a research question to cover the topic in more detail is also recommended. One student reported the knowledge difference among team members however, this is the heart of PL process where stronger students support the weaker ones, and this would be worth emphasizing at the course introduction.

In a quiz like fashion, students' understanding of key learning outcomes of the course was assessed before and after enrolment (Table 5). Statistically significant improvement in students' literature searching skills and articles selection process were measured ($p < 0.05$). This again fed into the main objective

of the course which is the development of skills necessary for the self-learning process such as searching outside the curriculum for updated knowledge. Furthermore, some questions showed an increase in the average score but without statistical significance ($p > 0.05$). This can be explained by the already good educational level of the enrolled students, who were willing to join extracurricular activities in time of war and pandemic.

Students scored less in questions about the peer review process ($p > 0.05$). This observation can be due to the fact that maybe the course did not necessarily bring novel knowledge to participants. Or the course design or the evaluation methodology need to be revisited as there was little emphasis on understanding the role of the peer review process in scientific publication. A clear learning outcome about the role of the peer review process should be added to the learning outcomes of week 1 of the course (Supplementary Table 1). It has been reported that this aspect of human knowledge generation is crucial and the correct theoretical and empirical understanding of it should be extended to higher education students (Tennant & Ross-Hellauer, 2020). Comparison of the effect of participants' gender or degree of study on their post-course quiz performance was done, and no statistically significant differences were observed between subgroups.

5. Limitation of the study

This study examined the overall success of the course in meeting its learning outcomes to a diverse audience from different fields of study. It did not look into intra- and inter group analysis due to the small number of participants in each group and field. This small sample size might also affect the quantitative measurement of academic research skills improvement as some questions showed an improved average score but remained statistically insignificant. Furthermore, the used instrument to measure students' progress in research skills was only assessed for reliability using Alpha Cronbach's and future work should focus on validating it with expert review and assessment of internal consistency. At this stage, the study focused on the UGs cohort recipient of the course, the aim is to investigate PGs, and Ass perspective once multiple cohorts of students attempt the course to examine areas of improvement with time and experience. The information gathered form students will guide future plans for course design improvement. This project can be enlarged in terms of total number of participants and covered fields of study. It can also be reproduced in other locations and developing countries.

6. Conclusion

This programme examined a novel approach for teaching students academic research to promote their self-learning and ability to conduct research in

Syria. The approach was designed as an extracurricular activity due to the limitations of its application within the university curriculum. The course design made use of peer and team-based learning. Participants were undergraduates who shared a positive perception about the course and its ability to develop their academic research skills in a statistically significant manner. The postgraduates who played the role of facilitators developed their own research and teaching skills too through the course. This 8-week extracurricular course can be very useful to support HE in developing world and can be an excellent basis and resource for society-driven research in impoverished and conflict-stricken countries.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Taher Hatahet is a lecture in the School of Pharmacy at Queen's University Belfast. His scientific research focuses on drug delivery using nanotechnology and lipid-based nano systems for small and large molecules. His educational research focuses on innovative teaching methodologies to support students' active learning and self-development.

Ahmad Alkhaledi is a postgraduate intern studying oncology in one of the educational hospitals of Damascus University in Syria. He is an active student participating and initiating extracurricular activities for self-development of medical students' evidence-based medicine learning.

Aya Tello is a postgraduate master student in Damascus University working in IT Department and involved in interdisciplinary students initiative.

Lana Jarad is a postgraduate master student in Damascus University working in medicine and involved in medical education students' initiative.

Ahmad Al Shihabi is a postgraduate master student in the USA and he is involved in medical education students' initiative in Syria and supporting Syrian students in their postgraduate studies planning.

ORCID

Taher Hatahet http://orcid.org/0000-0003-0171-3304

References

Alahdab, F., Firwana, B., Hasan, R., Sonbol, M. B., Fares, M., Alnahhas, I., Sabouni, A., & Ferwana, M. (2012). Undergraduate medical students' perceptions, attitudes, and competencies in evidence-based medicine (EBM), and their understanding of EBM reality in Syria. *BMC Research Notes*, *5*(1), 1–7. https://doi.org/10.1186/1756-0500-5-431

Al-Fattal, A., & Ayoubi, R. (2013). Student needs and motives when attending a university: Exploring the Syrian case. *Journal of Marketing for Higher Education*, *23*(2), 204–225. https://doi.org/10.1080/08841241.2013.866610

Ali, N., Anwer, M., & Jaffar, A. (2015). Impact of peer tutoring on learning of students. *Journal for Studies in Management and Planning*, *1*(2), 61–66. https://www.researchgate.net/publication/319292234_Impact_of_Peer_Tutoring_on_Learning_of_Students

Alibrahim, M. (2016, February 5). *Displaced Syrian private universities struggle to educate their students - Al-Fanar media*. News Article. https://www.al-fanarmedia.org/2016/02/displaced-syrian-private-universities-struggle-to-educate-their-students/

Arbo, P., & Benneworth, P. (2007). *Understanding the regional contribution of higher education institutions: A literature review*.

Ayoubi, R., Al-Ahmar, A., & Ahmar-Dakna, S. (2009). The national project or the national programme: An evaluation of tempus programme contribution to the development of the higher education sector in Syria. *Stuttgart*. https://www.tandfonline.com/doi/full/10.108003050068.2013.765643?casa_token=s8dgrazpeh8aaaaa%3a9xtaxkyainih8obvhsqp8p1qjb5xdl-talt15-j1mnxaqxaif7mewuvd1x8bqmj8z4tjd7wa65jo5k0

Bahnassi, A. (2020). Pharmacy education and practice in Syria: Past, present, and future. *JACCP: Journal of the American College of Clinical Pharmacy*, *3*(6), 1079–1084. https://doi.org/10.1002/jac5.1236

Benamer, H. T. S., & Bakoush, O. (2009). Arab nations lagging behind other Middle Eastern countries in biomedical research: a comparative study. *BMC Medical Research Methodology*, *9*(1), Article 26. https://doi.org/10.1186/1471-2288-9-26

Buckley, P., & Lee, P. (2021). The impact of extra-curricular activity on the student experience. *Active Learning in Higher Education*, *22*(1), 37–48. https://doi.org/10.1177/1469787418808988

Buckner, E. (2013). The seeds of discontent: Examining youth perceptions of higher education in Syria. *Comparative Education*, *49*(4), 440–463. https://doi.org/10.1080/03050068.2013.765643

Bulte, C., Betts, A., Garner, K., & Durning, S. (2007). Student teaching: Views of student near-peer teachers and learners. *Medical Teacher*, *29*(6), 583–590. https://doi.org/10.1080/01421590701583824

Burgess, A., McGregor, D., & Mellis, C. (2014). Medical students as peer tutors: A systematic review. *BMC Medical Education*, *14*(1), 1–8. https://doi.org/10.1186/1472-6920-14-1

Burgess, A., & Nestel, D. (2014). Facilitating the development of professional identity through peer assisted learning in medical education. *Advances in Medical Education and Practice*, *2014*(5), 403–406. https://doi.org/10.2147/AMEP.S72653

Cheung, F., Kube, A., Tay, L., Diener, E., Jackson, J. J., Lucas, R. E., Ni, M. Y., & Leung, G. M. (2020). The impact of the Syrian conflict on population well-being. *Nature Communications*, *11*(1), 1–10. https://doi.org/10.1038/s41467-019-13993-7

Devi, V., Abraham, R. R., Adiga, A., Ramnarayan, K., & Kamath, A. (2010). Fostering research skills in undergraduate medical students through Mentored Student Projects: Example from an Indian medical school. *Kathmandu University Medical Journal*, *8*(3), 294–298. https://doi.org/10.3126/kumj.v8i3.6215

Doolittle, P. E. (1997). Vygotsky's zone of proximal development as a theoretical foundation for cooperative learning. *Journal on Excellence in College Teaching*, *8*(1), 83–103. https://www.researchgate.net/publication/234590327_Vygotsky's_Zone_of_Proximal_Development_as_a_Theoretical_Foundation_for_Cooperative_Learning

Etzkowitz, H. (1990). The second academic revolution: The role of the research university in economic development. In Susan E. Cozzens, Peter Healey, Arie Rip, & John Ziman (Eds.), *The research system in transition* (pp. 109–124). Springer.

Friel, O., Kell, D., & Higgins, M. (2018). The evidence base for peer assisted learning in undergraduate medical education: A scoping study [version 1]. *MedEdPublish*, *7*(44). https://doi.org/10.15694/mep.2018.0000044.1

Gamlath, S. (2022). Peer learning and the undergraduate journey: a framework for student success. *Higher Education Research & Development*, *41*(3), 699–713. https://doi.org/10.1080/07294360.2021.1877625

Gottlieb, Z., Epstein, S., & Richards, J. (2017). Near-peer teaching programme for medical students. *The Clinical Teacher*, *14*(3), 164–169. https://doi.org/10.1111/tct.12540

Haider, M., & Yasmin, A. (2015). Significance of scaffolding and peer tutoring in the light of Vygotsky's theory of zone of proximal development. *International Journal of Languages, Literature and Linguistics*, *1*(3), 170–173. https://doi.org/10.18178/IJLLL.2015.1.3.33

Hall, S., Stephens, J., Andrade, T., Davids, J., Powell, M., & Border, S. (2014). Perceptions of junior doctors and undergraduate medical students as anatomy teachers: Investigating distance along the near-peer teaching spectrum. *Anatomical Sciences Education*, *7*(3), 242–247. https://doi.org/10.1002/ase.1419

Kabbani, N., & Salloum, S. (2010). Financing higher education in Syria. In Ahmed Galal & Taher Kanaan (Eds.), *Financing higher education in Arab countries* (pp. 103–116). http://knowledge4all.com/admin/Temp/Files/dd7dcda0-b5fc-4128-90c2-903de632ca02.pdf#page=108

Keeling, R. (2006). The Bologna process and the Lisbon research agenda: The European commission's expanding role in higher education discourse. *European Journal of Education*, *41*(2), 203–223. https://doi.org/10.1111/j.1465-3435.2006.00256.x

Krücken, G. (2014). Higher education reforms and unintended consequences: a research agenda. *Studies in Higher Education*, *39*(8), 1439–1450. https://doi.org/10.1080/03075079.2014.949539

Martin, M., & Edwards, L. (1998). Peer learning on fieldwork placements. *British Journal of Occupational Therapy*, *61*(6), 249–252. https://doi.org/10.1177/030802269806100603

Milton, S. (2019). Syrian higher education during conflict: Survival, protection, and regime security. *International Journal of Educational Development*, *64*(1), 38–47. https://doi.org/10.1016/j.ijedudev.2018.11.003

Mouzahem, H. (2014). *Syrian education a casualty of war*. Al-Monitor.

Murdoch-Eaton, D., Drewery, S., Elton, S., Emmerson, C., Marshall, M., Smith, J. A., Stark, P., & Whittle, S. (2010). What do medical students understand by research and research skills? Identifying research opportunities within undergraduate projects. *Medical Teacher*, *32*(3), e152–e160. https://doi.org/10.3109/01421591003657493

O'Kelly, M., Garrison, J., Merry, B., & Torreano, J. (2015). Building a peer-learning service for students in an academic library. *Portal: Libraries and the Academy*, *15*(1), 163–182. https://doi.org/10.1353/pla.2015.0000

Sabouni, A., Bdaiwi, Y., Janoudi, S. L., Namous, L. O., Turk, T., Alkhatib, M., Abbas, F., & Yafi, R. Z. (2017). Multiple strategy peer-taught evidence-based medicine course in a poor resource setting. *BMC Medical Education*, *17*(1), 1–6. https://doi.org/10.1186/s12909-017-0924-1

Sanders, D., & Welk, D. S. (2005). Strategies to scaffold student learning: Applying Vygotsky's zone of proximal development. *Nurse Educator*, *30*(5), 203–207. https://doi.org/10.1097/00006223-200509000-00007

Sharan, Y., & Sharan, S. (1992). *Expanding cooperative learning through group investigation* (Vol. 1234). Teachers College Press New York.

Sharma, N. (2020). Role of research in nation building. *NOLEGEIN-Journal of Business Risk Management*, *3*(2), 9–13. https://doi.org/10.37591/njbrm.vi0.637

Silén, C., & Uhlin, L. (2008). Self-directed learning – a learning issue for students and faculty!. *Teaching in Higher Education*, *13*(4), 461–475. https://doi.org/10.1080/13562510802169756

Task Force on Higher Education and Society. (2000). *Higher education in developing countries: Peril and promise*. The World Bank.

Tekkol, İA, & Demirel, M. (2018). An investigation of self-directed learning skills of undergraduate students. *Frontiers in Psychology*, *9*, Article 2324. https://doi.org/10.3389/fpsyg.2018.02324

Ten Cate, O., & Durning, S. (2007). Dimensions and psychology of peer teaching in medical education. *Medical Teacher*, *29*(6), 546–552. https://doi.org/10.1080/01421590701583816

Tennant, J. P., & Ross-Hellauer, T. (2020). The limitations to our understanding of peer review. *Research Integrity and Peer Review*, *5*(1), Article 6. https://doi.org/10.1186/s41073-020-00092-1

Tigau, C. (2019). Conflict-induced displacement of skilled refugees: A cross-case analysis of Syrian professionals in selected OECD countries. *Norteamérica*, *14*(1), 341–368. https://doi.org/10.22201/cisan.24487228e.2019.1.359

Topping, K. J. (1996). The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher Education*, *32*(3), 321–345. https://doi.org/10.1007/BF00138870

Tozan, O. (2023). The impact of the Syrian conflict on the higher education sector in Syria: A systematic review of literature. *International Journal of Educational Research Open*, *4*, Article 100221. https://doi.org/10.1016/j.ijedro.2022.100221

Whitman, N. A., & Fife, J. D. (1988). *Peer teaching: to teach is to learn twice.* ASHE-ERIC Higher Education Report No. 4, 1988. ERIC.

Widyahening, I. S., Findyartini, A., Ranakusuma, R. W., Dewiasty, E., & Harimurti, K. (2019). Evaluation of the role of near-peer teaching in critical appraisal skills learning: a randomized crossover trial. *International Journal of Medical Education*, *10*, 9–15. https://doi.org/10.5116/ijme.5c39.b55b

Yahia, M. (2011). The struggles of the Syrian science community. *Nature News*.

Zijdenbos, I. L., de Haan, M. C., Valk, G. D., & ten Cate, O. T. J. (2010). A student-led course in clinical reasoning in the core curriculum. *International Journal of Medical Education*, *1*(1), 42–46. https://doi.org/10.5116/ijme.4c18.94a5

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist*, *25*(1), 3–17. https://doi.org/10.1207/s15326985ep2501_2