SEMARAK ILMU PUBLISHING

Journal of Advanced Research in Applied Sciences and Engineering Technology

Journal homepage:
https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/index
ISSN: 2462-1943

Technology Support for Health-Promoting Lifestyle: Development and Testing

Yati Ruhayati[1], Nur Indri Rahayu[1,*], M. Muktiarni[1], Adang Suherman[1], J. Jajat[1], Kuston Sultoni[1], Affero Ismail[2], Jonah Mupita[3]

[1] Universitas Pendidikan Indonesia Jl. Dr. Setiabudi No.229, Bandung, 40154, Indonesia
[2] Universitas Tun Hussein Onn Malaysia, Persiaran Tun Dr. Ismail, 86400 Parit Raja, Johor, Malaysia
[3] Ruya Adventist High School, 49 Mount Darwin, Mount Darwin, Zimbabwe

ARTICLE INFO

Article history:
Received 1 December 2023
Received in revised form 12 May 2024
Accepted 10 June 2024
Available online 15 July 2024

Keywords:
Technology; Health; Promoting Lifestyle

ABSTRACT

In this study, we have described creating and deploying an online application designed to support university systems that promote healthy lifestyles. Based on the findings of small sample trials, several participants said they could easily access the program on their computer, tablet, or smartphone. Additionally, the participants stated that they extensively used the application's capabilities. Although participants' satisfaction ratings with the app were moderate, they expressed greater optimism over the program's overall potential for intervention. According to the results of our focus groups, users should receive further instruction on how to utilize the app to maximize their efficacy in subsequent research. The technical difficulties the research team encountered also emphasize how crucial it is to give appropriate time for large-scale trial studies. It is unclear whether eHealth interventions will contribute to the global physical activity pandemic in a timely and suitable manner, even though they have the potential to change particular participants' behavior. Physical exercise is a complicated behavior that can take place in a range of settings and be impacted by a number of environmental, social, and psychological elements. mental elements. It is recommended that future studies investigate the potential of technology-based intervention strategies to identify the most effective approach for bolstering university health-promoting systems, with the ultimate goal of influencing global community behavior.

1. Introduction

It has been detected that globally, the population at every layer and level is becoming less physically active and more sedentary. Both behaviours are independently associated with health outcomes and are causes of death [1-3]. There has been a lot of research carried out, especially in the last two decades, there has been a rapid increase in evaluating and designing research related to

* *Corresponding author.*
E-mail address: nurindrirahayu1910@upi.edu

https://doi.org/10.37934/araset.48.2.251270

physical activity tests [4,5]. Several examples of the physical activity in education are shown in Table 1.

Table 1
Example reports on physical activity

No	Title	Author(s)	Ref.
1.	Boxing training technology based on the level of physical development of children	Ilhomovich	[6]
2.	Development analysis research on physics education by mapping keywords using the VOSviewer application	Al Husaeni, D.N.	[7]
3.	The efficiency of the experimental methods of improving complex technical and tactical actions of boxers	Kurbanmuratovich	[8]
4.	A critical success factors model for golf athletes' talent development in Malaysia and Indonesia	Suherman et al.	[9]
5.	Improving the effectiveness of the method of conducting physical education classes for students of grades 5-9 in hot climate	Ulaboevich	[10]
6.	Different types of yoga as a sport	Kamraju	[11]
7.	Technologies for selecting boxers and preparing them for competitions	Djurabevich	[12]
8.	Bibliometric analysis of research development in sports science with vosviewer	Al Husaeni	[13]
9.	The mechanism of development of professional and pedagogical creativity of future physical education teachers based on a competent approach	Hasanovna	[14]
10.	Nutritional research mapping for endurance sports: A bibliometric analysis	Firdaus et al.	[15]
11.	Development of the theoretical foundations of sports activity (sports business) in post-industrial conditions	Glushchenko	[16]
12.	Effect small side games (SSG) on playing skills in handball sport	Ramdhani, A.F., and Saputra, M.Y.	[17]
13.	Analysis of boxers' pulse oximeter and chronometry ability to perform during boxing	Mansur, U.	[18]
14.	Yoga and weight management	Kamraju et al.	[19]
15.	The impact of yoga on physical health	Kamraju	[20]
16.	Effect of weight exercise on the development of some components of special muscle strength and perform some artistic gymnastics skills	Kadhim	[21]
17.	Effect of demonstration method on primary school pupils' academic achievement in physical and health education	Obafemi et al.	[22]
18.	Rehabilitation program for surgical shoulder joint protrusion among team games players injured	Yaseen	[23]
19.	Effect of physical exercise on weight reduction of students	Adesokan et al.	[24]
20.	Yoga and chronic conditions	Kamraju	[25]
21.	Effectiveness of cooperative learning using multimedia in some physical abilities and basic skills for junior players in basketball	Abbood	[26]
22.	Health-related factors and teaching performance of physical education teachers amidst COVID-19 pandemic	Vera, M.J.C., and Calixtro Jr, V.L.	[27]
23.	Teachers 21st century skills special program in sports curriculum	Bantilan	[28]

This has become a supporting system for health institutions and organisations to produce evidence-based physical activity recommendations [29]. In various countries, public health guidelines recommend that adults do at least 150 to 300 minutes of moderate-intensity physical activity. The form of physical activity carried out can be muscle-strengthening activities carried out at least 2 times a week [29]. However, in reality, only a few people achieve this amount of physical activity each week, and evidence suggests that physical activity increases and meets recommendations only initially, but is not sustained and consistent over the long term [30-32].

Based on data in several developed countries such as the United States and England, physical activity that meets recommendations is only followed by 1% to 16% of adults, which includes activities to strengthen muscles [33,34], and reduce the risk of falls, fractures and osteoporosis [35].

Of great concern is the fact that adults spend approximately 60% to 70% of their waking hours engaged in sedentary activities alone [36]. Meanwhile, several research results state that for inactive adults, high sedentary activity is associated with an increased risk of developing non-communicable diseases (eg type 2 diabetes) and may be the main cause of death [37]. Overall, this shows the need for more innovative interventions to encourage people to undertake and regularly engage in physical activity and reduce sedentary activities.

To increase the level of physical activity involved in the university population, effective interventions with a wide reach are needed. Considering that interventions via mobile health (mHealth) can be used everywhere by involving many people, and the delivery costs are relatively cheap and can be carried out at a convenient time and place [38]. Therefore, these tools can be used to promote physical activity interventions in university populations [39]. Furthermore, interventions through mHealth can integrate key health behavior change strategies, including self-monitoring, goal setting, prompts or motivation, and feedback on behaviors that are effective in increasing participation in physical activity [40]. There is a large body of systematic evidence supporting the use of mHealth as an intervention to promote health behavior change [38,41,42], although trials with long-term follow-up (e.g. > 6 months) should be conducted [43,44]. Reports on physical activities have been increased as shown by bibliometric analysis, especially related to technology support (see Figure 1). Bibliometric analysis is one of the effective methods for understanding research trend in many subject areas (see Table 2). Detailed information on how to use bibliometric analysis is explained elsewhere [45]. This research aims to determine the level of knowledge of teachers in vocational education regarding OER and the extent to which teachers have integrated OER in the implementation of learning.

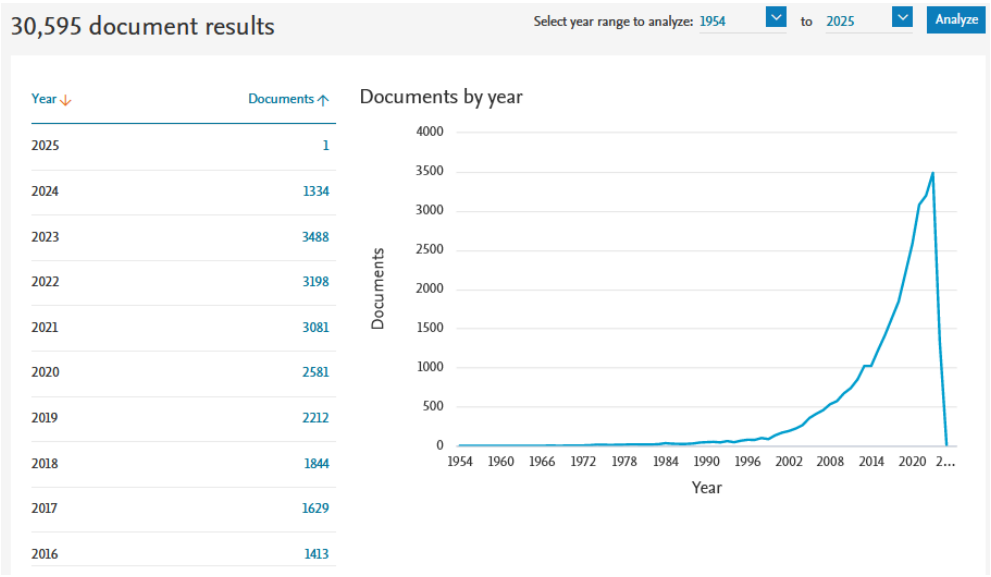

Fig. 1. Scopus database results for technology in physical activity, taken in May 2024

Table 2
Previous studies on bibliometric analysis (published in 2023-2024)

No	Author(s)	Title	Ref.
1	Utama, D.M., Santoso, I., Hendrawan, Y., and Dania, W.A.P.	Sustainable Production-inventory model with multi-material, quality degradation, and probabilistic demand: From bibliometric analysis to a robust model	[46]
2	Sahidin, I., Nohong, N., Manggau, M.A., Arfan, A., Wahyuni, W., Meylani, I., Malaka, M.H., Rahmatika, N.S., Yodha,	Phytochemical profile and biological activities of ethylacetate extract of peanut (Arachis hypogaea L.)	[47]

No	Author(s)	Title	Ref.
	A.W.M., Masrika, N.U.E., Kamaluddin, A., Sundowo, A., Fajriah, S., Asasutjarit, R., Fristiohady, A., Maryanti, R., Rahayu, N.I., and Muktiarni, M.	stems: In-vitro and in-silico studies with bibliometric analysis	
3	Hamidah, I., Ramdhani, R., Wiyono, A., Mulyanti, B., Pawinanto, E.E., Hasanah, L., Diantoro, M., Yuliarto, B., Yunas, J., and Rusydi, A.	Biomass-based supercapacitors electrodes for electrical energy storage systems activated using chemical activation method: A literature review and bibliometric analysis.	[48]
4	Arianingrum, R., Aznam, N., Atun, S., Senam, S., Irwan, A.R., Juhara, N.Q., Anisa, N.F., and Devani, L.K.	Antiangiogenesis activity of Indonesian local black garlic (Allium Sativum 'Solo): Experiments and bibliometric analysis.	[49]
5	Rahmat, A., Sutiharni, S., Elfina, Y., Yusnaini, Y., Latuponu, H., Minah, F.N., Sulistyowati, Y., and Mutolib, A.	Characteristics of tamarind seed biochar at different pyrolysis temperatures as waste management strategy: experiments and bibliometric analysis.	[50]
6	Abduh, A., Mulyanah, A., Darmawati, B., Zabadi, F., Sidik, U., Handoko, W., Jayadi, K., and Rosmaladewi, R.	The compleat lextutor application tool for academic and technological lexical learning: Review and bibliometric approach.	[51]
7	Juhanaini, J., Bela, M.R.W.A.T., and Rizqita, A.J.	How eyes and brain see color: Definition of color, literature review with bibliometric analysis, and inquiry learning strategy for teaching color changes to student with mild intelligence barriers.	[52]
8	Mardina, P., Wijayanti, H., Juwita, R., Putra, M.D., Nata, I.F., Lestari, R., Al-Amin, M.F., Suciagi, R.A., Rawei, O.K., and Lestari, L.	Corncob-derived sulfonated magnetic solid catalyst synthesis as heterogeneous catalyst in the esterification of waste cooking oil and bibliometric analysis.	[53]
9	Solihah, P.A., Kaniawati, I., Samsudin, A., and Riandi, R.	Prototype of greenhouse effect for improving problem-solving skills in science, technology, engineering, and mathematics (STEM)-education for sustainable development (ESD): Literature review, bibliometric, and experiment.	[54]
10	Yang, W., Chookhampaeng, C., and Chano, J.	Spatial visualization ability assessment for analyzing differences and exploring influencing factors: Literature review with bibliometrics and experiment	[55]
11	Angraini, L.M., Susilawati, A., Noto, M.S., Wahyuni, R., and Andrian, D.	Augmented reality for cultivating computational thinking skills in mathematics completed with literature review, bibliometrics, and experiments for students	[56]
12	Nurramadhani, A., Riandi, R., Permanasari, A., and Suwarma, I.R.	Low-carbon food consumption for solving climate change mitigation: Literature review with bibliometric and simple calculation application for cultivating sustainability consciousness in facing sustainable development goals (SDGs)	[57]
13	Imaniyati, N., Ramdhany, M.A., Rasto, R., Nurjanah, S., Solihah, P.A., and Susilawati, A.	Neuroscience intervention for implementing digital transformation and organizational health completed with literature review, bibliometrics, and experiments.	[58]
14	Amida, N., Nahadi, N., Supriyanti, F.M.T., Liliasari, L., Maulana, D., Ekaputri, R.Z., and Utami, I.S.	Phylogenetic analysis of Bengkulu citrus based on DNA sequencing enhanced chemistry students' system thinking skills: Literature review with bibliometrics and experiments.	[59]
15	Kadir, A., Istadi, I., Subagio, A., Waluyo, W., and Muis, A.	The ship's propeller rotation threshold for coral reef ecosystems based on sediment rate indicators: Literature review with bibliometric analysis and experiments.	[60]
16	Shafiq, D.A., Al-Obaidi, A.S.M., Gunasagaran, S., and Mari, T.S.	Empowering engineering female students to improve retention and progression: A program evaluation study completed with bibliometric analysis.	[61]
17	Shidiq, A.P.A.	Bibliometric analysis of nano metal-organic frameworks synthesis research in medical science using VOSviewer.	[62]

No	Author(s)	Title	Ref.
18	Nandiyanto, A.B.D., Fiandini, M., and Al Husaeni, D.N.	Research trends from the scopus database using keyword water hyacinth and ecosystem: A bibliometric literature review.	[63]
19	Lizama, M.G., Huesa, J., and Claudio, B.M.	Use of blockchain technology for the exchange and secure transmission of medical images in the cloud: Systematic review with bibliometric analysis.	[64]
20	Al Husaeni, D.F., Haristiani, N., Wahyudin, W., and Rasim, R.	Chatbot artificial intelligence as educational tools in science and engineering education: A literature review and bibliometric mapping analysis with its advantages and disadvantages.	[65]
21	Al Husaeni, D.F., Al Husaeni, D.N., Nandiyanto, A.B.D., Rokhman, M., Chalim, S., Chano, J., Al Obaidi, A.S.M., and Roestamy, M.	How technology can change educational research? Definition, factors for improving quality of education and computational bibliometric analysis.	[66]
22	Laita, M., Sabbahi, R., Elbouzidi, A., Hammouti, B., Messaoudi, Z., Benkirane, R., and Aithaddou, H.	Effects of sustained deficit irrigation on vegetative growth and yield of plum trees under the semi-arid conditions: Experiments and review with bibliometric analysis.	[67]
23	Al Husaeni, D.N., and Nandiyanto, A.B.D.	Bibliometric analysis of high school keyword using VOSviewer indexed by google scholar	[68]
24	Zafrullah, Z., and Ramadhani, A.M.	The use of mobile learning in schools as a learning media: Bibliometric analysis	[69]
25	Kongsaenkham, A., and Chano, J.	Bibliometric analysis using VOSviewer with Publish or Perish of role-play in the teaching and learning.	[70]
26	Farokhah, L., Herman, T., Wahyudin, W., and Abidin, Z.	Global research trends of mathematics literacy in elementary school: A bibliometric analysis.	[71]
27	Al Husaeni, D.F., and Munir, M.	Literature review and bibliometric mapping analysis: Philosophy of science and technology education	[72]
28	Pramanik, P.D., and Rahmanita, M.	Strengthening the role of local community in developing countries through community-based tourism from education perspective: Bibliometric analysis.	[73]
29	Rasuman, M.A., Nandi, N., Astari, A.J., and Ashie, A.B.	Trends and networks in education for sustainable development (ESD): A bibliometric analysis using vosviewer.	[74]
30	Tungtawee, C., and Chano, J.	Bibliometric analysis using VOSviewer with Publish or Perish of curriculum evaluation using the CIPP model.	[75]
31	Muktiarni, M., Nur Indri Rahayu, Affero Ismail, and Amalia Kusuma Wardani	Bibliometric computational mapping analysis of trend metaverse in education using vosviewer.	[76]
32	Nandiyanto, Asep Bayu Dani, Dwi Fitria Al Husaeni, and Dwi Novia Al Husaeni	Introducing ASEAN Journal for Science and Engineering in Materials: Bibliometric Analysis.	[77]
33	Nandiyanto, Asep Bayu Dani, Dwi Novia Al Husaeni, and Dwi Fitria Al Husaeni	Introducing ASEAN Journal of Science and Engineering: A bibliometric analysis study	[78]
34	Nandiyanto, Asep Bayu Dani, Dwi Fitria Al Husaeni, and Dwi Novia Al Husaeni	Social impact and internationalization of “Indonesian Journal of Science and Technology	[79]
35	Nandiyanto, Asep Bayu Dani, Dwi Novia Al Husaeni, Dwi Fitria Al Husaeni, Ida Hamidah, Bunyamin Maftuh, and M. Solehuddin.	Is universitas pendidikan indonesia ready for internationalization? A bibliometric analysis in the science and technology-related publications	[80]
36	Muktiarni, M., Rahayu, N. I., Nurhayati, A., Bachari, A. D., & Ismail, A.	Concept of Computational Fluid Dynamics Design and Analysis Tool for Food Industry: A Bibliometric	[81]
37	Rachmat, B., Agust, K., Rahayu, N. I., & Muktiarni, M.	Concept of Computational Fluid Dynamics and Its Application in Sport Science: Bibliometric Analysis of Modelling Thermal Comfort in Sport Hall	[82]
48	Nandiyanto, Asep Bayu Dani, Risti Ragadhita, and Muhammad Aziz.	Involving particle technology in computational fluid dynamics research: A bibliometric analysis.	[83]

This research aims to describe a systematic, theory-based process (using IM) to develop a smartphone-based physical activity application linked to an individual physical activity tracking system that can ultimately increase participation and individual physical activity levels.

2. Theoretical Framework

Physical inactivity has been described as a global pandemic [84] and occurs almost worldwide. The latest data estimates show that around 80% of young people experience physical inactivity internationally, and do not meet the physical activity guidelines recommended by WHO, namely 60 minutes of moderate to vigorous physical activity (MVPA) each. Research results state that adolescent boys are usually more active than girls [85-88], but have significantly higher levels of screen time [89], making them vulnerable to unhealthy weight gain and social and emotional well-being. the bad one. Schools and Educational institutions such as colleges are identified as ideal settings for physical activity, as well as the promotion and prevention of obesity, because they have access to the majority of adolescents, adequate facilities, and qualified personnel to achieve these outcomes. Based on research results from previous research, the novelty in this research is the use of "snack app" principles and theory which intervenes in physical activity as an activity that is carried out for a short duration but is carried out as often as possible, so that cumulatively it can meet WHO physical activity recommendations, and can even exceed the limits. at least. Apart from that, in this research, the application that was built was able to track its users' physical activity and provide feedback and suggestions regarding strategies for achieving the users' physical activity targets.

Many studies have been carried out to develop, improve, and even evaluate health promotion through physical activity [90,91]. This is one way to motivate and support organizations or individuals to carry out movements while promoting a healthy and active lifestyle throughout life which will ultimately have implications for health [91,92]. This research makes a significant contribution to public health, particularly in managing and changing health behavior. This research provides insight and reinforcement that the world of education has a high contribution in carrying out this healthy living movement, because the world of education is a strategic place to facilitate health promotion and effectively help improve the level of public health. Health promotion activities in educational environments at universities are supported by WHO. Health-promoting universities are WHO-supported projects that are studied based on conceptual, field experience and action frameworks. During the year 2000, the entire fabric of community life and social activities in cities, schools, workplaces and home environments, should provide greater opportunities for improving health (WHO Europe Copenhagen, 1998). Schools are identified as ideal settings for physical activity and health promotion, due to the effectiveness of school-based interventions in increasing physical activity and preventing obesity [93, 94]. In comparison, evidence on the effectiveness of school-based interventions targeting adolescents finds that school-based interventions are twice as successful as interventions targeting adolescents in regular social settings [93, 95, 96]. The challenges of achieving health behavior change have prompted the exploration of new and exciting intervention strategies. The stages of behavior change consist of five stages, namely pre-contemplation, contemplation, preparation, action and maintenance [97]. The stages of behavior change can be seen in Figure 2.

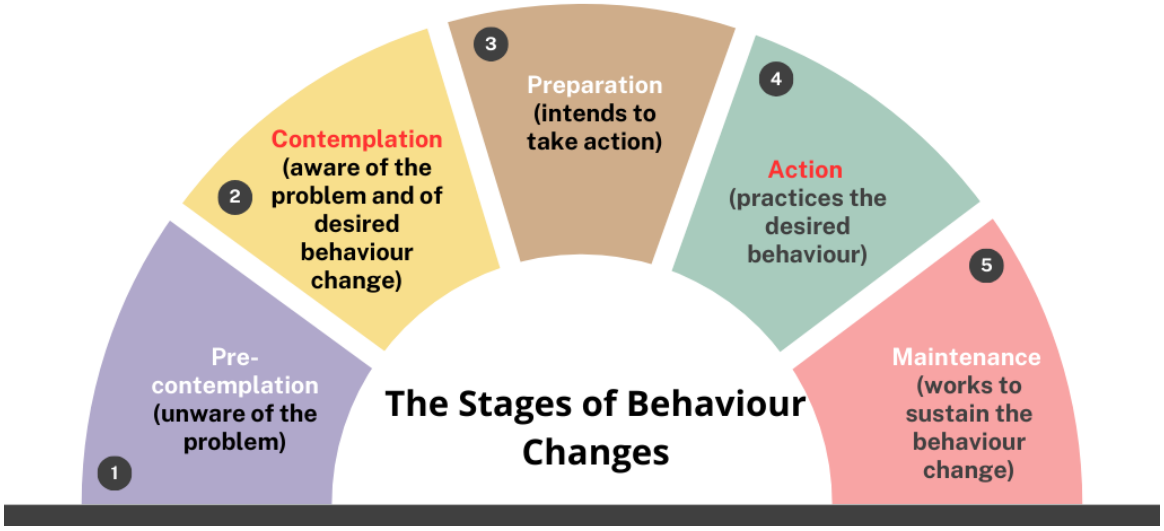

Fig. 2. The stages of behavior change

Guidelines for healthy and active living have been developed in several countries which aim to provide recommendations for physical activity according to WHO recommendations, namely with moderate to high intensity with a duration of between 150-300 minutes and with a frequency of at least 2 times a week. This recommendation is given in the context of preventive and curative efforts to overcome health problems due to lack of movement or non-communicable diseases. Several research results state that adults who are sedentary and do not carry out physical activity as recommended are at higher risk of developing non-communicable diseases (for example type 2 diabetes and heart disease) and may be the main cause of death [98]. Globally, innovative, interesting and effective movements are needed quickly to help people have high motivation to live a physically active, regular and sustainable life. Activities and movements for health promotion focus on participants' involvement in continuous physical activity, with moderate to heavy intensity, carried out for a short duration but carried out continuously and sustainably. Some activities that may be done with a low to moderate level of difficulty include walking, squatting and standing, standing while teaching or doing work, or climbing stairs. Health promotion and an active lifestyle can be a source of reference for preventive and curative measures against non-communicable diseases such as obesity, high blood pressure, heart disease, and so on. Educational settings, especially universities have access to the majority of adolescents, adequate facilities, and qualified personnel to achieve effective outcomes [99]. For a number of years, the usage of IT in healthcare has increased dramatically [100]. However, utilization within health promotion is just beginning to emerge, as seen by the very modest percentage of research papers included in the reviewed publication series [101]. Despite the fact that the Internet may contain a wealth of material that promotes health, relatively little research has been done on the subject. It should be mentioned that there haven't been many critical researches on the usage of technology [102].

2. Methodology

This study developed an application that was part of a larger study to test the effectiveness of the application in increasing physical activity throughout the day in adults [16]. The app works by self-monitoring, providing feedback on the activity completed, offering users a method for setting goals, and creating an action plan to complete their physical activity each day. This application development framework consists of 6 work plan stages, these stages are ways of working that are

often applied to guide the development of interventions aimed at changing health behavior. The first four stages of this application development process include (1) Needs for Assessment specifying intervention outcomes and objectives, (3) designing the intervention and applying theory, and (4) refining intervention development. Meanwhile, the last 2 steps for Application Development (adoption, implementation, and evaluation plan) The flow diagram for this research is as follows Figure 3. The flowchart for developing this web-based application is as follows Figure 4.

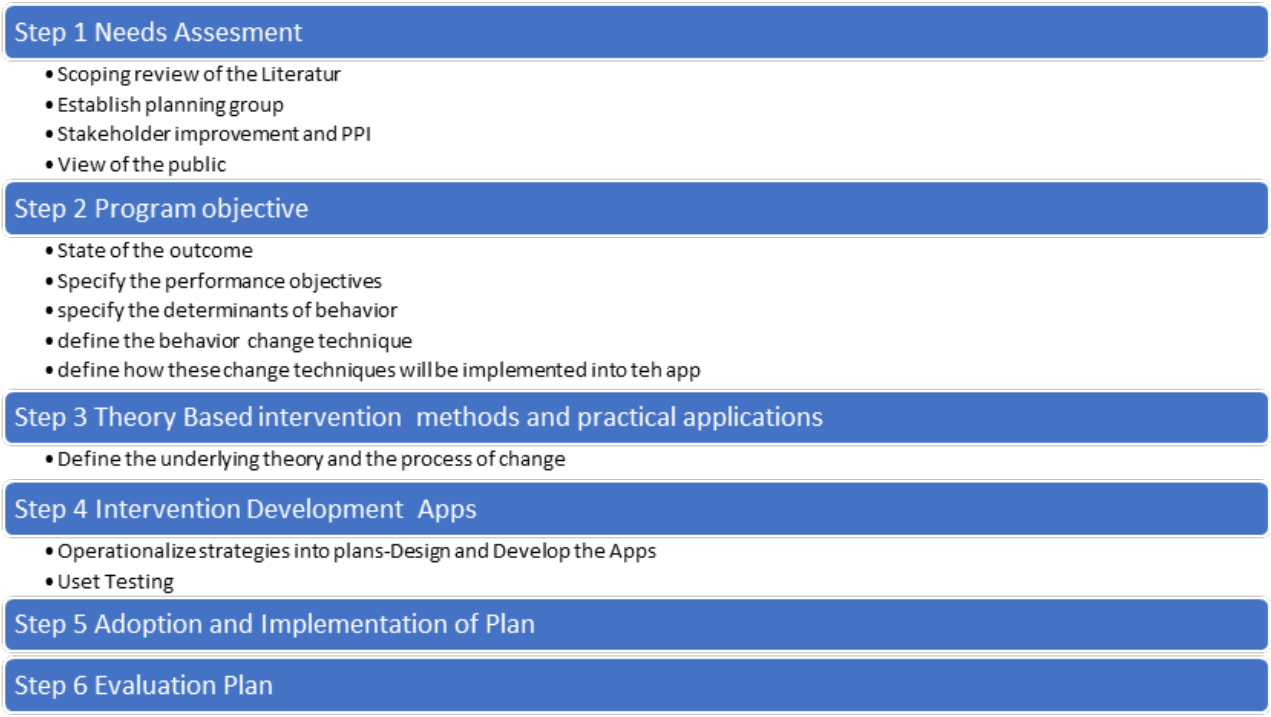

Fig. 3. Diagram for this research

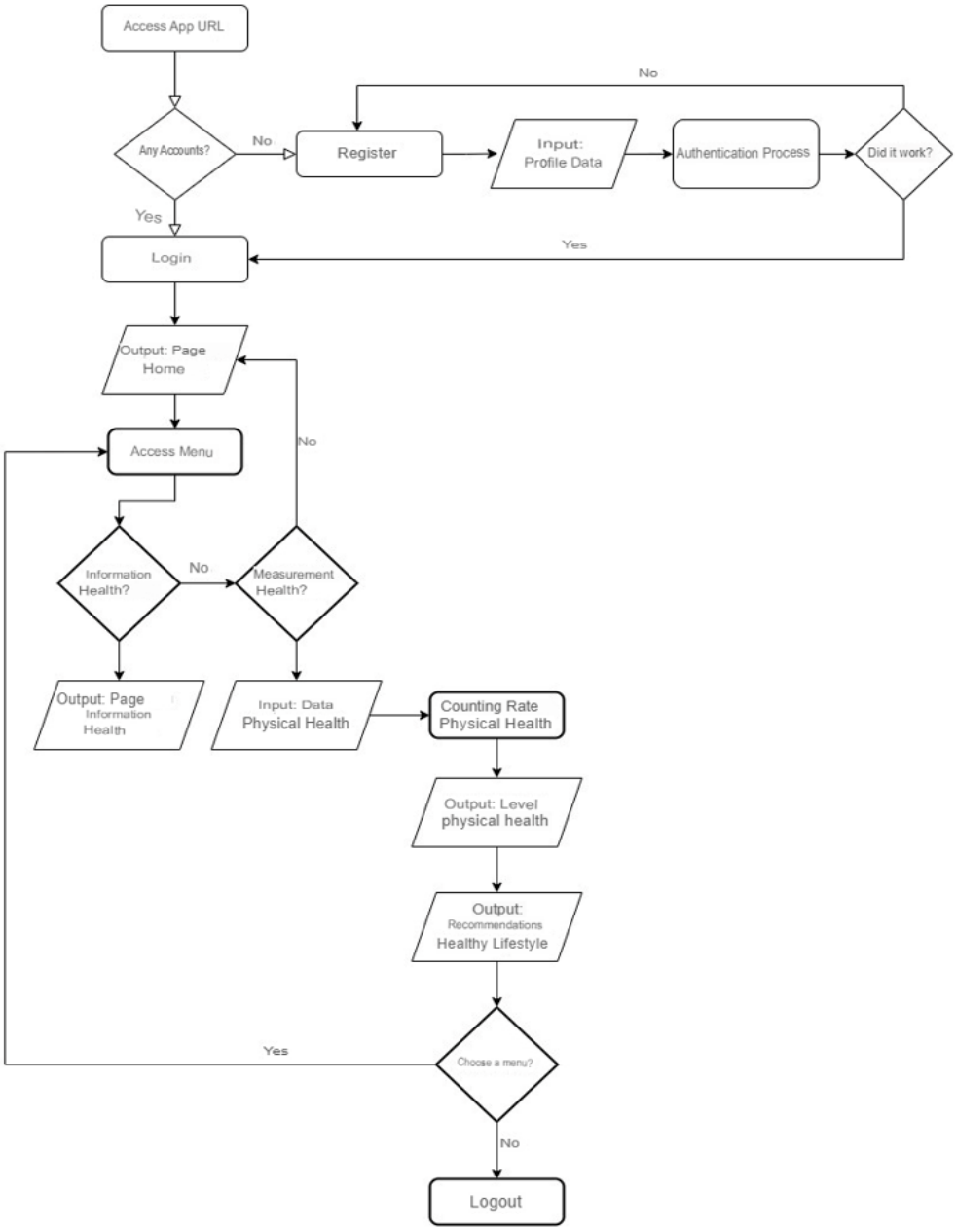

Fig. 4. The flowchart for developing this web-based application

2.1 Participants

Participants are used as objects to conduct small sample trials to detect the main function of this application. Participants involved in this small sample trial were the academic community of the Indonesian Education University consisting of lecturers, students, and university staff totaling 100 people.

2.2. Instruments

The evaluation process for this research product also used The Adaptation of ATLAS Evaluation Questionnaire to test items on the type of app/website usage and the frequency of use as well as

their behavioral intentions. Apart from that, the evaluation process was also carried out qualitatively through focus group discussions between researchers and expert judges from relevant fields.

3. Results and Discussion

3.1 Website Design

Website design is carried out in several stages, from needs assessment, Specification of Outcomes, Performance Objectives, Change Techniques, Theory-Based Intervention Methods and Practical Applications, Development of Application, Adoption and Implementation Plan, and Evaluation Plan. The entire process can be seen in the following explanation:

3.1.1 Stage 1 needs assessment

In stage 1, several activities need to be carried out as an initial step in application development as follows:

(i) Overview literatur
Reviews relevant literature on behaviour change theories and techniques related to physical activity promotion, as well as Interventions [103]. This helps guide the content that will be built such as strategies and techniques, application implementation, and participant engagement [104].

(ii) Planning Group
Create a working group of people who will build the application. This planning group consists of people who have expertise relevant to creating the application. This planning group consists of 8 members with various scientific backgrounds, namely IT experts, physical activity experts, medical experts, psychology experts, nutrition experts, and members as supporting systems [105].

(iii) Stakeholder and patient public involvement
This stage was carried out by surveying the community to find out their responses and perceptions regarding the initial development of the intervention using the application. It is planned that 100 community members will be surveyed regarding the application concept and use of digital technology as a behaviour change mechanism. Some of the information that will be explored is regarding the importance of embracing digital technology to enable people to live a healthier lifestyle. Apart from that, the concept that needs to be ensured is that there are sufficient opportunities for community members to do this. Including. also input from the community which makes it possible to add features to the application that will be developed [106].

(iv) View of the public
At this stage, analyze and determine the community's views obtained based on the results of previous surveys.

3.1.2 Stage 2 specification of outcomes, performance objectives, and change techniques

The second step is the development of specific health features that align behavior in the application with the Behavior Change Technique (BCT). Based on information from the findings from stage 1 (needs assessment), then identify 3 main performance objectives for developing this application. This also includes the goals the individual wants to achieve to complete the application features [107].

3.1.3 Stage 3: Theory-based intervention methods and practical applications

A key principle in the development of this application was to encourage users to learn from their experiences through engagement in self-regulatory activities (e.g., self-monitoring, feedback, and goal setting), in line with control theory and self-regulation theory; building intrinsic motivation; And promotes autonomy (also consistent with self-determination theory). An important goal of the app is to promote the formation of active daily living habits in line with the habit formation model to maximize the potential of app use and physical activity [108].

3.1.4 Stage 4: Development of application

At this stage, the application that will be used for intervention begins to be developed and created. The application development consists of the following components:

(i) Application and Physical Activity Tracking
This feature was created so that users can self-monitor their goals and receive feedback. This feature provides decisions about how physical activity should be measured and how the user is progressing. One way to achieve this is to use device-based physical activity measurements (e.g., accelerometers, fitness trackers, and smartwatches) that can continuously record physical activity [109].

(ii) Mobile App Development
This application will be in the form of a mobile app consisting of 5 features, namely Dashboard, Status, Goals, Resources, and notifications. An image of the mobile app development interface design can be seen in Figure 5.

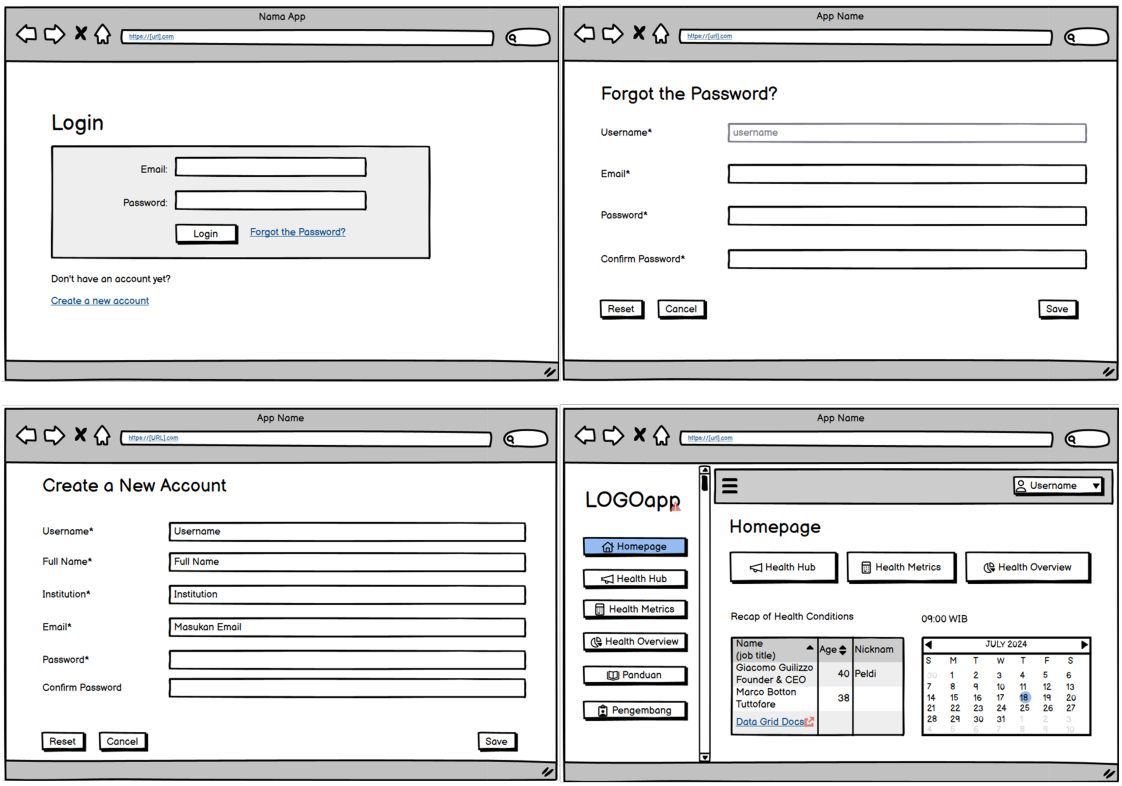

Fig. 5. Mobile app development interface design

3.1.5 Stage 5 Adoption and Implementation Plan

At this stage, an intervention will be carried out as an application trial on a small-scale sample. Pre-test-post-test group design will be applied in this intervention, which aims to test the effectiveness of the application. Ethical approval and informed consent will be given to participants before carrying out the intervention. The participants consisted of 50 Indonesian Education University students. Participants will download the application and carry out interventions according to the guidelines for 16 sessions [110].

3.1.6 Stage 6 Evaluation Plan

At this stage, the data collection process is carried out using the User Version of the Mobile Application Rating Scale, The Adaptation of ATLAS Evaluation Questionnaire to test items on the type of app/website usage and the frequency of use as well as their behavioral intentions. Apart from that, the evaluation process was also carried out qualitatively through focus group discussions between researchers and expert judges from relevant fields [111].

3.2 Research Results based on the Use of Website-Based Applications

The results of research based on the use of website-based applications found that participants in this study did not depend on ownership of Smartphones, in other words, the use of applications can also be accessed easily on tablet devices or computers [112].

However, 58% of participants reportedly had access to a smartphone or tablet device. The research results also reported that the majority of participants, namely 69%, reported that they found it easy to access the functions and use of the application to carry out their activities and goals, 22% reported difficulty accessing the application, and 9% did not access the application and did not carry out activities at all. The research results show that technology use has become widespread, not only limited to smartphones but also more widely using other devices such as tablets or laptops [113-117].

3.3 The Research Results are Based on the Staisfaction and Behavioral Interventions Website

Based on data analysis regarding Website satisfaction and Behavioral Interventions, 82% of participants agreed that the website-based application was fun to use. After using the application, it was also reported that participants had a desire to limit recreational screen time (X = 4.25 +- 1.59), limit consumption of sweet drinks (X = 5.25 +- 1.82), actively participate in regular MVPA (X = 4.32 +- 0.97), and muscle reinforcement activity (X = 4.01 +- 0.83). Based on this data, it can be seen that the level of completion of the physical activity program adapted to the application carried out by participants is in the high category [118].

3.4 Focus Group Discussion (FGD) Results

Based on the results of focus group discussions between the research team and various relevant and competent expert judges, it is known that thematic analysis revealed in The various themes that emerged regarding participants' general impact on the impact of the application program being developed contained several sub-themes represents changes in behavior, knowledge, and attitudes related to school, eating patterns, and perceived physical activity have participated directly as a result

of involvement in the web-based application usage program [117,118]. Testing of the website-based health promotion application shows that the application is ready to be used by various groups. The website's student health promotion application makes it easy for users to access the health information system and multiple recommendations given to users [119,120]. The creation of this promotional application has also been based on several previous studies regarding health and quality of life [121-125].

4. Conclusions

In this research, we have explained the development and implementation of a web-based application aimed at Supporting a System for Health-Promoting Lifestyle in Universities. Results of small sample trials on several participants reported having easy access to the application via smartphone, tablet, or computer. Participants also reported that they used and were heavily involved with the features contained in the application. Participants reported moderate levels of satisfaction with the app but were more positive about the possibility of intervening with the app in general. Findings from our focus groups suggest that additional training on how to use the app is needed for users to increase effectiveness in future studies. Additionally, the technical glitches experienced by the research team highlight the importance of allowing sufficient time to conduct studies through large sample trials. Although eHealth interventions have behavioral promise changes among certain participants, it is unlikely that they will make a rapid and appropriate contribution to the global physical activity pandemic. Physical activity is complex behavior that can occur in a variety of environments and influenced by various psychological, social, and environmental factors. mental factors. Future research is encouraged to explore the utility of technology-based intervention strategy to determine the right strategy for supporting systems in the framework of health-promoting in the universities whose ultimate goal is changing community behavior globally.

References

[1] Lee, I-Min, Eric J Shiroma, Felipe Lobelo, Pekka Puska, Steven N Blair, and Peter T Katzmarzyk. "Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy." The Lancet 380, no. 9838 (July 2012): 219–29. https://doi.org/10.1016/s0140-6736(12)61031-9.

[2] Kohl, Harold W, Cora Lynn Craig, Estelle Victoria Lambert, Shigeru Inoue, Jasem Ramadan Alkandari, Grit Leetongin, and Sonja Kahlmeier. "The pandemic of physical inactivity: global action for public health." The Lancet 380, no. 9838 (July 2012): 294–305. https://doi.org/10.1016/s0140-6736(12)60898-8.

[3] Wilmot, E. G., C. L. Edwardson, F. A. Achana, M. J. Davies, T. Gorely, L. J. Gray, K. Khunti, T. Yates, and S. J. H. Biddle. "Sedentary time in adults and the association with diabetes, cardiovascular disease and death: systematic review and meta-analysis." Diabetologia 55, no. 11 (August 14, 2012): 2895–2905. https://doi.org/10.1007/s00125-012-2677-z.

[4] Greaves, Colin J, Kate E Sheppard, Charles Abraham, Wendy Hardeman, Michael Roden, Philip H Evans, and Peter Schwarz. "Systematic review of reviews of intervention components associated with increased effectiveness in dietary and physical activity interventions." BMC Public Health 11, no. 1 (February 18, 2011). https://doi.org/10.1186/1471-2458-11-119.

[5] Samdal, Gro Beate, Geir Egil Eide, Tom Barth, Geoffrey Williams, and Eivind Meland. "Effective behaviour change techniques for physical activity and healthy eating in overweight and obese adults; systematic review and meta-regression analyses." International Journal of Behavioral Nutrition and Physical Activity 14, no. 1 (March 28, 2017). https://doi.org/10.1186/s12966-017-0494-y.

[6] Ilhomovich, I.A. "Boxing training technology based on the level of physical development of children" *ASEAN Journal of Physical Education and Sport Science* 1, no. 1 (2022):1-8.

[7] Al Husaeni, D.N. "Development analysis research on physics education by mapping keywords using the VOSviewer application." *ASEAN Journal of Physical Education and Sport Science* 1, no. 1 (2022):9-18.

[8] Kurbanmuratovich, U.M. "The efficiency of the experimental methods of improving complex technical and tactical actions of boxers." *ASEAN Journal of Physical Education and Sport Science* 1, no. 1 (2022):19-26.

[9] Suherman, A., Yassin, A., Rahayu, N.I., and Sartono, H. "A critical success factors model for golf athletes' talent development in Malaysia and Indonesia." *ASEAN Journal of Physical Education and Sport Science* 1, no. 1 (2022): 27-34.
[10] Ulaboevich, B.G. Improving the effectiveness of the method of conducting physical education classes for students of grades 5-9 in hot climates. *ASEAN Journal of Physical Education and Sport Science* 1, no. 1 (2022):35-44.
[11] Kamraju. M. "Different types of yoga as a sport." *ASEAN Journal of Physical Education and Sport Science* 1, no. 1 (2022):51-58.
[12] Djurabevich, M.S. "Technologies for selecting boxers and preparing them for competitions." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023):1-8.
[13] Al Husaeni, D.N. "Bibliometric analysis of research development in sports science with vosviewer." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023):9-16.
[14] Hasanovna, H.M. "The mechanism of development of professional and pedagogical creativity of future physical education teachers based on a competent approach." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023):17-22.
[15] Firdaus, I.R., Febrianty, M.F., Awwaludin, P.N., Ilsya, M.N.F., Nurcahya, Y., and Sultoni, K. "Nutritional research mapping for endurance sports: A bibliometric analysis." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023):23-38.
[16] Glushchenko, V.V. "Development of the theoretical foundations of sports activity (sports business) in post-industrial conditions." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023):39-60.
[17] Ramdhani, A.F., and Saputra, M.Y. "Effect small side games (SSG) on playing skills in handball sports." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023):61-68.
[18] Mansur, U. "Analysis of boxers' pulse oximeter and chronometry ability to perform during boxing." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023):69-74.
[19] Kamraju, M., Ali, M.A., and Krishnaiah, J. "Yoga and weight management." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023):75-80.
[20] Kamraju, M. "The impact of yoga on physical health." *ASEAN Journal of Physical Education and Sport Science* 2, no. 2 (2023):81-88.
[21] Kadhim, K.I. "Effect of weight exercise on the development of some components of special muscle strength and perform some artistic gymnastics skills." *ASEAN Journal of Physical Education and Sport Science* 2, no. 2 (2023):89-98.
[22] Obafemi, K.E., Obafemi, T.O., and Yakubu, F.M. "Effect of demonstration method on primary school pupils' academic achievement in physical and health education" *ASEAN Journal of Physical Education and Sport Science* 2, no. 2 (2023): 99-104.
[23] Yaseen, S.T. "Rehabilitation program for surgical shoulder joint protrusion among team games players injured." *ASEAN Journal of Physical Education and Sport Science* 2, no. 2 (2023):105-116.
[24] Adesokan, A., Ogunfeyitimi, E.O., Obafemi, K.E., and Adesokan, T.T. "Effect of physical exercise on weight reduction of students." *ASEAN Journal of Physical Education and Sport Science* 2, no. 2 (2023):117-122.
[25] Kamraju, M. "Yoga and chronic conditions." *ASEAN Journal of Physical Education and Sport Science* 3, no. 1 (2024):1-6.
[26] Abbood, A.M.H. "Effectiveness of cooperative learning using multimedia in some physical abilities and basic skills for junior players in basketball." *ASEAN Journal of Physical Education and Sport Science* 3, no. 1 (2024):7-16.
[27] Vera, M.J.C., and Calixtro Jr, V.L. "Health-related factors and teaching performance of physical education teachers amidst COVID-19 pandemic." *ASEAN Journal of Physical Education and Sport Science* 3, no. 1 (2024):17-26.
[28] Bantilan, E.N. "Teachers 21st century skills special program in sports curriculum." *ASEAN Journal of Physical Education and Sport Science* 3, no. 1 (2024):27-34.
[29] Bull, Fiona C, Salih S Al-Ansari, Stuart Biddle, Katja Borodulin, Matthew P Buman, Greet Cardon, Catherine Carty, et al. "World Health Organization 2020 guidelines on physical activity and sedentary behaviour." *British Journal of Sports Medicine* 54, no. 24 (November 25, 2020): 1451–62. https://doi.org/10.1136/bjsports-2020-102955.
[30] Foster, Charles, Melvyn Hillsdon, Margaret Thorogood, Asha Kaur, and Thamindu Wedatilake. "Interventions for promoting physical activity." *Cochrane Database of Systematic Reviews*, January 24, 2005. https://doi.org/10.1002/14651858.cd003180.pub2.
[31] Kwasnicka, Dominika, Stephan U Dombrowski, Martin White, and Falko Sniehotta. "Theoretical explanations for maintenance of behaviour change: a systematic review of behaviour theories." *Health Psychology Review* 10, no. 3 (March 7, 2016): 277–96. https://doi.org/10.1080/17437199.2016.1151372.
[32] Zenko, Zachary, Erik A. Willis, and David A. White. "Proportion of Adults Meeting the 2018 Physical Activity Guidelines for Americans According to Accelerometers." *Frontiers in Public Health* 7 (June 7, 2019). https://doi.org/10.3389/fpubh.2019.00135.

[33] Bennie, Jason A., Tracy Kolbe-Alexander, Jan Seghers, Stuart J.H. Biddle, and Katrien De Cocker. "Trends in Muscle-Strengthening Exercise Among Nationally Representative Samples of United States Adults Between 2011 and 2017." *Journal of Physical Activity and Health* 17, no. 5 (May 1, 2020): 512–18. https://doi.org/10.1123/jpah.2019-0472.

[34] Bennie, Jason A., Katrien De Cocker, Jordan J. Smith, and Glen H. Wiesner. "The epidemiology of muscle-strengthening exercise in Europe: A 28-country comparison including 280,605 adults." Edited by Stephanie Prince Ware. *PLOS ONE* 15, no. 11 (November 25, 2020): e0242220. https://doi.org/10.1371/journal.pone.0242220.

[35] Chamblee, Daryl A. "Department of health and human services NATIONAL INSTITUTES OF HEALTH RECOMBINANT DNA advisory committee notice of meeting." *Biotechnology Law Report* 12, no. 5 (September 1993): 613–29. https://doi.org/10.1089/blr.1993.12.613.

[36] Biswas, Aviroop, Paul I. Oh, Guy E. Faulkner, Ravi R. Bajaj, Michael A. Silver, Marc S. Mitchell, and David A. Alter. "Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults." *Annals of Internal Medicine* 162, no. 2 (January 20, 2015): 123–32. https://doi.org/10.7326/m14-1651.

[37] Ekelund, Ulf, Jakob Tarp, Jostein Steene-Johannessen, Bjørge H Hansen, Barbara Jefferis, Morten W Fagerland, Peter Whincup, et al. "Dose-response associations between accelerometry measured physical activity and sedentary time and all-cause mortality: systematic review and harmonised meta-analysis." *BMJ*, August 21, 2019, l4570. https://doi.org/10.1136/bmj.l4570.

[38] Marcolino, Milena Soriano, João Antonio Queiroz Oliveira, Marcelo D'Agostino, Antonio Luiz Ribeiro, Maria Beatriz Moreira Alkmim, and David Novillo-Ortiz. "The impact of mHealth interventions: Systematic review of systematic reviews." *JMIR mHealth and uHealth* 6, no. 1 (January 17, 2018): e23. https://doi.org/10.2196/mhealth.8873.

[39] Romeo, Amelia, Sarah Edney, Ronald Plotnikoff, Rachel Curtis, Jillian Ryan, Ilea Sanders, Alyson Crozier, and Carol Maher. "Can smartphone apps increase physical activity? systematic review and meta-analysis." *Journal of Medical Internet Research* 21, no. 3 (March 19, 2019): e12053. https://doi.org/10.2196/12053.

[40] Michie, Susan, Charles Abraham, Craig Whittington, John McAteer, and Sunjai Gupta. "Effective techniques in healthy eating and physical activity interventions: A meta-regression." *Health Psychology* 28, no. 6 (2009): 690–701. https://doi.org/10.1037/a0016136.

[41] Aromatario, O., A. Van Hoye, A. Vuillemin, A.-M. Foucaut, C. Crozet, J. Pommier, and L. Cambon. "How do mobile health applications support behaviour changes? A scoping review of mobile health applications relating to physical activity and eating behaviours." *Public Health* 175 (October 2019): 8–18. https://doi.org/10.1016/j.puhe.2019.06.011.

[42] Afshin, Ashkan, Damilola Babalola, Mireille Mclean, Zhi Yu, Wenjie Ma, Cheng-Yu Chen, Mandana Arabi, and Dariush Mozaffarian. "Information technology and lifestyle: A systematic evaluation of internet and mobile interventions for improving diet, physical activity, obesity, tobacco, and alcohol use." *Journal of the American Heart Association* 5, no. 9 (September 2016). https://doi.org/10.1161/jaha.115.003058.

[43] Lunde, Pernille, Birgitta Blakstad Nilsson, Astrid Bergland, Kari Jorunn Kværner, and Asta Bye. "The effectiveness of smartphone apps for lifestyle improvement in noncommunicable diseases: Systematic review and meta-analyses." *Journal of Medical Internet Research* 20, no. 5 (May 4, 2018): e162. https://doi.org/10.2196/jmir.9751.

[44] Muellmann, Saskia, Sarah Forberger, Tobias Möllers, Eileen Bröring, Hajo Zeeb, and Claudia R. Pischke. "Effectiveness of eHealth interventions for the promotion of physical activity in older adults: A systematic review." *Preventive Medicine* 108 (March 2018): 93–110. https://doi.org/10.1016/j.ypmed.2017.12.026.

[45] Al Husaeni, Dwi Fitria, and Asep Bayu Dani Nandiyanto. "Bibliometric using Vosviewer with Publish or Perish (using google scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre and post Covid-19 pandemic." *ASEAN Journal of Science and Engineering* 2, no. 1 (2022): 19-46. https://doi.org/10.17509/ajse.v2i1.37368.

[46] Utama, D.M., Santoso, I., Hendrawan, Y., and Dania, W.A.P. "Sustainable production-inventory model with multi-material, quality degradation, and probabilistic demand: From bibliometric analysis to a robust model." *Indonesian Journal of Science and Technology* 8, no. 2 (2023):171-196.

[47] Sahidin, Idin, N. Nohong, Marianti A. Manggau, A. Arfan, W. Wahyuni, Iren Meylani, M. Hajrul Malaka, Nur Syifa Rahmatika, Agung W. M. Yodha, Nur Upik En Masrika, Abdulkadir Kamaluddin, Andini Sundowo, Sofa Fajriah, Rathapon Asasutjarit, Adryan Fristiohady, Rina Maryanti, Nur Indri Rahayu, M. Muktiarni, "Phytochemical profile and biological activities of ethylacetate extract of peanut (Arachis hypogaea L.) stems: In-vitro and in-silico studies with bibliometric analysis." *Indonesian Journal of Science and Technology* 8, no. 2 (2023): 217-242. https://doi.org/10.17509/ijost.v8i2.54822

[48] Hamidah, Ida, Ramdhani Ramdhani, Apri Wiyono, Budi Mulyanti, Roer Eka Pawinanto, Lilik Hasanah, Markus Diantoro, Brian Yuliarto, Jumril Yunas, and Andrivo Rusydi. "Biomass-based supercapacitors electrodes for electrical energy storage systems activated using chemical activation method: A literature review and bibliometric analysis." *Indonesian Journal of Science and Technology* 8, no. 3 (2023): 439-468

[49] Arianingrum, Retno, Nurfina Aznam, Sri Atun, S. Senam, Alya Rizkita Irwan, Nida Qurbaniah Juhara, Nadiya Fitri Anisa, and Latifah Kurnia Devani. "Antiangiogenesis Activity of Indonesian Local Black Garlic (Allium Sativum 'Solo): Experiments and Bibliometric Analysis." *Indonesian Journal of Science and Technology* 8, no. 3 (2023): 487-498. https://doi.org/10.17509/ijost.v8i3.63334.

[50] Rahmat, Ali, Sutiharni Sutiharni, Yetti Elfina, Yusnaini Yusnaini, Hadidjah Latuponu, Faidliyah Nilna Minah, Yeny Sulistyowati, and Abdul Mutolib. "Characteristics of Tamarind Seed Biochar at Different Pyrolysis Temperatures as Waste Management Strategy: Experiments and Bibliometric Analysis." *Indonesian Journal of Science and Technology* 8, no. 3 (2023): 517-538. https://doi.org/10.17509/ijost.v8i3.63500.

[51] Abduh, Amirullah, Ade Mulianah, Besse Darmawati, Fairul Zabadi, Umar Sidik, Wuri Handoko, Karta Jayadi, and Rosmaladewi Rosmaladewi. "The Compleat Lextutor Application Tool for Academic and Technological Lexical Learning: Review and Bibliometric Approach." *Indonesian Journal of Science and Technology* 8, no. 3 (2023): 539-560. https://doi.org/10.17509/ijost.v8i3.63539.

[52] Juhanaini, J., Muhamad Rafi Wildan A. Tandu Bela, and Alya Jilan Rizqita. "How Eyes and Brain See Color: Definition of Color, Literature Review with Bibliometric Analysis, and Inquiry Learning Strategy for Teaching Color Changes to Student with Mild Intelligence Barriers." *Indonesian Journal of Science and Technology* 8, no. 3: 561-580. https://doi.org/10.17509/ijost.v8i3.68623

[53] Mardina, Primata, Hesti Wijayanti, Rinna Juwita, Meilana Dharma Putra, Iryanti Fatyasari Nata, Rowina Lestari, Muhammad Faqih Al-Amin, Regi Abizar Suciagi, Oktefani Kusuma Rawei, and Liza Lestari. "Corncob-Derived Sulfonated Magnetic Solid Catalyst Synthesis as Heterogeneous Catalyst in The Esterification of Waste Cooking Oil and Bibliometric Analysis." *Indonesian Journal of Science and Technology* 9, no. 1 (2024): 109-124. https://doi.org/10.17509/ijost.v9i1.64219

[54] Solihah, P., Kaniawati, I., Samsudin, A., & Riandi, R. "Prototype of greenhouse effect for improving problem-solving skills in science, technology, engineering, and mathematics (stem)-education for sustainable development (ESD): Literature review, bibliometric, and experiment." *Indonesian Journal of Science and Technology 9*, no. 1 (2023): 163-190. https://doi.org/10.17509/ijost.v9i1.66773

[55] Yang, Weizhi, Chowwalit Chookhampaeng, and Jiraporn Chano. "Spatial Visualization Ability Assessment for Analyzing Differences and Exploring Influencing Factors: Literature Review with Bibliometrics and Experiment." *Indonesian Journal of Science and Technology* 9, no. 1: 191-224. https://doi.org/10.17509/ijost.v9i1.66774

[56] Angraini, Lilis Marina, Aay Susilawati, Muchamad Subali Noto, Reni Wahyuni, and Dedek Andria. "Augmented Reality for Cultivating Computational Thinking Skills in Mathematics Completed with Literature Review, Bibliometrics, and Experiments to Students." *Indonesian Journal of Science & Technology* 9, no. 01 (2024): 225-260. https://doi.org/10.17509/ijost.v9i1.67258

[57] Nurramadhani, Annisa, R. Riandi, Anna Permanasari, and Irma Rahma Suwarma. "Low-carbon food consumption for solving climate change mitigation: Literature review with bibliometric and simple calculation application for cultivating sustainability consciousness in facing sustainable development goals (SDGs)." *Indonesian Journal of Science and Technology* 9, no. 2 (2023): 261-286. https://doi.org/10.17509/ijost.v9i1.67302

[58] Imaniyati, Nani, M. Arief Ramdhany, R. Rasto, Santi Nurjanah, Putri Amelia Solihah, and Aay Susilawati. "Neuroscience intervention for implementing digital transformation and organizational health completed with literature review, bibliometrics, and experiments." *Indonesian Journal of Science and Technology* 9, no. 2 (2024): 287-336. https://doi.org/10.17509/ijost.v9i2.67763

[59] Amida, Nadia, N. Nahadi, Florentina Maria Titin Supriyanti, L. Liliasari, Devri Maulana, Rendi Zulni Ekaputri, and Indri Sari Utami. "Phylogenetic analysis of Bengkulu citrus based on DNA sequencing enhanced chemistry students' system thinking skills: Literature review with bibliometrics and experiments." *Indonesian Journal of Science and Technology* 9, no. 2 (2024): 337-354. https://doi.org/10.17509/ijost.v9i2.67813

[60] Kadir, Abdul, I. Istadi, Agus Subagio, W. Waluyo, and Abdul Muis. "The ship's propeller rotation threshold for coral reef ecosystems based on sediment rate indicators: Literature review with bibliometric analysis and experiments." *Indonesian Journal of Science and Technology* 9, no. 2 (2024): 355-372. https://doi.org/10.17509/ijost.v9i2.67894

[61] Shafiq, Dalia Abdulkareem, Abdulkareem Sh Mahdi Al-Obaidi, Sujatavani Gunasagaran, and Tamil Salvi Mari. "Empowering Engineering Female Students to Improve Retention and Progression: A Program Evaluation Study Completed with Bibliometric Analysis." *Indonesian Journal of Science and Technology* 9, no. 2 (2024): 373-394. https://doi.org/10.17509/ijost.v9i2.68492

[62] Shidiq, Andika Purnama. "A bibliometric analysis of nano metal-organic frameworks synthesis research in medical science using VOSviewer." *ASEAN Journal of Science and Engineering* 3, no. 1 (2023): 31-38.

[63] Nandiyanto, Asep Bayu Dani Meli Fiandini, and Dwi Novia Al Husaeni. "Research trends from the scopus database using keyword water hyacinth and ecosystem: A bibliometric literature review." *ASEAN Journal of Science and Engineering* 4, no. 1 (2024): 33-48. https://doi.org/10.17509/ajse.v4i1.60149

[64] Lizama, M.G., Huesa, J., and Claudio, B.M. "Use of blockchain technology for the exchange and secure transmission of medical images in the cloud: Systematic review with bibliometric analysis." *ASEAN Jou rnal of Science and Engineering 4*, no. 1 (2024): 71 -92.

[65] Al Husaeni, Dwi Fitria, Nuria Haristiani, W. Wahyudin, and R. Rasim. "Chatbot Artificial Intelligence as Educational Tools in Science and Engineering Education: A Literature Review and Bibliometric Mapping Analysis with Its Advantages and Disadvantages." *ASEAN Journal of Science and Engineering* 4, no. 1: 93-118. https://doi.org/10.17509/ajse.v4i1.67429

[66] Al Husaeni, Dwi Fitria, Dwi NoviaAl Husaeni, Asep Bayu Dani Nandiyanto, Mauhibur Rokhman, Saefuddin Chalim, Jiraporn Chano, Abdulkareem Sh Mahdi Al-Obaidi, and Martin Roestamy. "How technology can change educational research? definition, factors for improving quality of education and computational bibliometric analysis." *ASEAN Journal of Science and Engineering* 4, no. 2 (2024): 127-166. https://doi.org/10.17509/ajse.v4i2.62045

[67] Laita, Meriame, Rachid Sabbahi, Amine Elbouzidi, Belkheir Hammouti, Zerhoune Messaoudi, Rachid Benkirane, and Houssain Aithaddou. "Effects of Sustained Deficit Irrigation on Vegetative Growth and Yield of Plum Trees Under the Semi-Arid Conditions: Experiments and Review with Bibliometric Analysis." *ASEAN Journal of Science and Engineering* 4, no. 2 (2024): 167-190.

[68] Al Husaeni, Dwi Novia, and Asep Bayu Dani Nandiyanto. "Bibliometric analysis of high school keyword using VOSviewer indexed by google scholar." *Indonesian Journal of Educational Research and Technology* 3, no. 1 (2023): 1-12. https://doi.org/10.17509/ijcsne.v3i1.43181

[69] Zafrullah, Zafrullah, and Atika Miftah Ramadhani. "The use of mobile learning in schools as a learning media: Bibliometric analysis." *Indonesian Journal of Educational Research and Technology* 4, no. 2 (2024): 187-202. https://doi.org/10.17509/ijert.v4i2.65586

[70] Kongsaenkham, Ananya, and Jiraporn Chano. "Bibliometric analysis using VOSviewer with Publish or Perish of Role-play in the Teaching and Learning." *Indonesian Journal of Educational Research and Technology* 4, no. 3: 271-278. https://doi.org/10.17509/ijert.v4i3.69008

[71] Farokhah, Laely, Tatang Herman, W. Wahyudin, and Zaenal Abidin. "Global Research Trends of Mathematics Literacy in Elementary School: A Bibliometric Analysis." *Indonesian Journal of Educational Research and Technology* 4, no. 3: 279-290. https://doi.org/10.17509/ijert.v4i3.69019

[72] Al Husaeni, Dwi Fitria, and M. Munir. "Literature review and bibliometric mapping analysis: Philosophy of science and technology education." *Indonesian Journal of Multidiciplinary Research* 3, no. 2 (2023): 219-234. https://doi.org/10.17509/ijomr.v3i2.56242

[73] Pramanik, Purwanti Dyah, and Myrza Rahmanita. "Strengthening the role of local community in developing countries through community-based tourism from education perspective: Bibliometric analysis." *Indonesian Journal of Multidiciplinary Research* 3, no. 2 (2023): 331-348. https://doi.org/10.17509/ijomr.v3i2.57948

[74] Rasuman, Mohammad Abedin, N. Nandi, Annisa Joviani Astari, and Acsanie Bationg Ashie. "Trends and networks in education for sustainable development (ESD): A bibliometric analysis using vosviewer." *Indonesian Journal of Multidiciplinary Research* 4, no. 1 (2024): 109-126. https://doi.org/10.17509/ijomr.v4i1.68093

[75] Tungtawee, Chanatinat, and Jiraporn Chano. "Bibliometric Analysis using VOSviewer with Publish or Perish of Curriculum Evaluation using the CIPP Model." *Indonesian Journal of Multidiciplinary Research* 4, no. 1: 163-170. https://doi.org/10.17509/ijomr.v4i1.69011

[76] Muktiarni, M., Nur Indri Rahayu, Affero Ismail, and Amalia Kusuma Wardani. "Bibliometric computational mapping analysis of trend metaverse in education using vosviewer." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 32, no. 2 (2023): 95-106. https://doi.org/10.37934/araset.32.2.95106.

[77] Nandiyanto, Asep Bayu Dani, Dwi Fitria Al Husaeni, and Dwi Novia Al Husaeni. "Introducing ASEAN Journal for Science and Engineering in Materials: Bibliometric Analysis." *Journal of Advanced Research in Applied Mechanics* 112, no. 1 (2024): 102-113. https://doi.org/10.37934/aram.112.1.102113

[78] Nandiyanto, Asep Bayu Dani, Dwi Novia Al Husaeni, and Dwi Fitria Al Husaeni. "Introducing ASEAN Journal of Science and Engineering: A bibliometric analysis study." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 31, no. 3 (2023): 173-190. https://doi.org/10.37934/araset.31.3.173190

[79] Nandiyanto, Asep Bayu Dani, Dwi Fitria Al Husaeni, and Dwi Novia Al Husaeni. "Social impact and internationalization of "Indonesian Journal of Science and Technology" the best journal in Indonesia: a bibliometric analysis." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 32, no. 2 (2023): 42-59. https://doi.org/10.37934/araset.32.2.4259%20.

[80] Nandiyanto, Asep Bayu Dani, Dwi Novia Al Husaeni, Dwi Fitria Al Husaeni, Ida Hamidah, Bunyamin Maftuh, and M. Solehuddin. "Is universitas pendidikan indonesia ready for internationalization? A bibliometric analysis in the science and technology-related publications." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 32, no. 2 (2023): 14-29. https://doi.org/10.37934/araset.32.2.1429.

[81] Muktiarni, M., Rahayu, N. I., Nurhayati, A., Bachari, A. D., & Ismail, A. "Concept of Computational Fluid Dynamics Design and Analysis Tool for Food Industry: A Bibliometric." *CFD Letters* 16, no. 2 (2024): 1-23. https://doi.org/10.37934/cfdl.16.2.123

[82] Rachmat, B., Agust, K., Rahayu, N. I., & Muktiarni, M. "Concept of Computational Fluid Dynamics and Its Application in Sport Science: Bibliometric Analysis of Modelling Thermal Comfort in Sport Hall." *CFD Letters* 16, no. 1 (2024): 1-21. https://doi.org/10.37934/cfdl.16.1.121

[83] Nandiyanto, Asep Bayu Dani, Risti Ragadhita, and Muhammad Aziz. "Involving particle technology in computational fluid dynamics research: A bibliometric analysis." *CFD Letters* 15, no. 11 (2023): 92-109. https://doi.org/10.37934/cfdl.15.11.92109

[84] Hallal PC, Bo Andersen L, Bull FC, Guthold R, Haskell W, Ekelund U, "Global physical activity levels: surveillance progress, pitfalls, and prospects." *Lancet* 380 (2012):247–57. https://doi.org/10.1016/S0140-6736(12)60646-1

[85] Tremblay M. S., Le Blanc A. G., Kho M. E., Saunders T. J., Larouche R., Colley R. C. "A systematic review of sedentary behavior and health indicators in school-aged children and youth." *International Journal of Behavioral Nutrition and Physical Activity* 8, (2011):98. https://doi.org/10.1186/1479- 5868-8-98.

[86] Costigan S., Barnett L.M., Plotnikoff R.C., Lubans D.R. "The health indicators associated with screen-based sedentary behavior in adolescent girls: a systematic review." *J Adolesc Health* 52, no. 4 (2013):382–92. https://doi.org/10.1016/j.health.2012.07.018.

[87] Janssen, Ian, and Allana G LeBlanc. "Systematic review of the health benefits of physical activity and fitness in school-aged children and youth." *International Journal of Behavioral Nutrition and Physical Activity* 7, no. 1 (2010): 40. https://doi.org/10.1186/1479-5868-7-40.

[88] Centers for Disease Control and Prevention. "Physical activity levels of high school students–United States." *Morb Mortal Wkly Rep* 60, no. 23 (2011):773–7.

[89] Salmon, Jo, Mark S. Tremblay, Simon J. Marshall, and Clare Hume. "Health risks, correlates, and interventions to reduce sedentary behavior in young people." *American Journal of Preventive Medicine* 41, no. 2 (August 2011): 197–206. https://doi.org/10.1016/j.amepre.2011.05.001.

[90] C. J. Greaves. "Systematic review of reviews of intervention components associated with increased effectiveness in dietary and physical activity interventions." *BMC Public Health* 11, no. 1 (February 18, 2011). https://doi.org/10.1186/1471-2458-11-119.

[91] G. B. Samdal, G. E. Eide, T. Barth, G. Williams, and E. Meland. "Effective behaviour change techniques for physical activity and healthy eating in overweight and obese adults; systematic review and meta-regression analyses," *International Journal of Behavioral Nutrition and Physical Activity* 14, no. 1 (2017). https://doi.org/10.1186/s12966-017-0494-y.

[92] Gibson-Moore, H. "UK Chief Medical Officers' physical activity guidelines 2019: What's new and how can we get people more active?" *Nutrition Bulletin* 44, no. 4 (November 25, 2019): 320–28. https://doi.org/10.1111/nbu.12409.

[93] Waters, Elizabeth, Andrea De Silva-Sanigorski, Belinda J. Burford, Tamara Brown, Karen J. Campbell, Yang Gao, Rebecca Armstrong, Lauren Prosser, and Carolyn D. Summerbell. "Interventions for preventing obesity in children." *Sao Paulo Medical Journal* 132, no. 2 (2014): 128–29. https://doi.org/10.1590/1516-3180.20141322t2.

[94] Eather, Narelle, Philip J. Morgan, and David R. Lubans. "Improving the fitness and physical activity levels of primary school children: Results of the Fit-4-Fun group randomized controlled trial." *Preventive Medicine* 56, no. 1 (January 2013): 12–19. https://doi.org/10.1016/j.ypmed.2012.10.019.

[95] Buru, Kakale, Theophilus I. Emeto, Aduli E. O. Malau-Aduli, and Bunmi S. Malau-Aduli. "The Efficacy of School-Based Interventions in Preventing Adolescent Obesity in Australia." *Healthcare* 8, no. 4 (November 25, 2020): 514. https://doi.org/10.3390/healthcare8040514.

[96] Nagy-Pénzes, Gabriella, Ferenc Vincze, and Éva Bíró. "A school intervention's impact on adolescents' health-related knowledge and behavior." *Frontiers in Public Health* 10 (March 14, 2022). https://doi.org/10.3389/fpubh.2022.822155.

[97] Doherty, Anne M., and Fiona Gaughran. "The interface of physical and mental health." *Social Psychiatry and Psychiatric Epidemiology* 49, no. 5 (February 22, 2014): 673–82. https://doi.org/10.1007/s00127-014-0847-7.

[98] U. Ekelund "Dose-response associations between accelerometry measured physical activity and sedentary time and all-cause mortality: systematic review and harmonised meta-analysis." *BMJ* August 21, (2019):l4570. https://doi.org/10.1136/bmj.l4570.

[99] C. Foster, M. Hillsdon, M. Thorogood, A. Kaur, and T. Wedatilake, "Interventions for promoting physical activity," *Cochrane Database of Systematic Reviews* 2005, https://doi.org/10.1002/14651858.CD003180.pub2.

[100] Alotaibi, Yasser K., and Frank Federico. "The impact of health information technology on patient safety." *Saudi Medical Journal* 38, no. 12 (December 2017): 1173–80. https://doi.org/10.15537/smj.2017.12.20631.

[101] Colizzi, Marco, Antonio Lasalvia, and Mirella Ruggeri. "Prevention and early intervention in youth mental health: is it time for a multidisciplinary and trans-diagnostic model for care?" *International Journal of Mental Health Systems* 14, no. 1 (March 24, 2020). https://doi.org/10.1186/s13033-020-00356-9.
[102] Farsi, Deema. "Social media and health care, part I: Literature review of social media use by health care providers." *Journal of Medical Internet Research* 23, no. 4 (April 5, 2021): e23205. https://doi.org/10.2196/23205.
[103] Thal, Sascha B., Lucas A. Maunz, Eleanor Quested, Stephen J. Bright, Bronwyn Myers, and Nikos Ntoumanis. "Behavior change techniques in physical activity interventions for adults with substance use disorders: A systematic review." *Psychology of Addictive Behaviors* 37, no. 3 (May 2023): 416–33. https://doi.org/10.1037/adb0000842.
[104] Fenton, Sally A.M., Joan L. Duda, Jet J.C.S. Veldhuijzen Van Zanten, George S. Metsios, and George D. Kitas. "Theory-informed interventions to promote physical activity and reduce sedentary behaviour in rheumatoid arthritis: a critical review of the literature." *Mediterranean Journal of Rheumatology* 31, no. 1 (2019): 19. https://doi.org/10.31138/mjr.31.1.19.
[105] Kozlowski, Steve W. J. "Enhancing the effectiveness of work groups and teams: a reflection." *Perspectives on Psychological Science* 13, no. 2 (December 12, 2017): 205–12. https://doi.org/10.1177/1745691617697078.
[106] Dwivedi, Yogesh K., Elvira Ismagilova, D. Laurie Hughes, Jamie Carlson, Raffaele Filieri, Jenna Jacobson, Varsha Jain, et al. "Setting the future of digital and social media marketing research: Perspectives and research propositions." *International Journal of Information Management* 59 (August 2021): 102168. https://doi.org/10.1016/j.ijinfomgt.2020.102168.
[107] Weissman, Shannon E, Ryanne Perinpanayagam, F. Virginia Wright, and Kelly P Arbour-Nicitopoulos. "Application of the behaviour change technique taxonomy (BCTTv1) to an inclusive physical literacy-based sport program for children and youth." *International Journal of Sports Science & Coaching* 17, no. 1 (May 27, 2021): 18–36. https://doi.org/10.1177/17479541211016580.
[108] Ashton, Sharkey, Whatnall, Williams, Bezzina, Aguiar, Collins, and Hutchesson. "Effectiveness of interventions and behaviour change techniques for improving dietary intake in young adults: A systematic review and meta-analysis of RCTs." *Nutrients* 11, no. 4 (April 11, 2019): 825. https://doi.org/10.3390/nu11040825.
[109] Ghanvatkar, Suparna, Atreyi Kankanhalli, and Vaibhav Rajan. "User models for personalized physical activity interventions: Scoping review." *JMIR mHealth and uHealth* 7, no. 1 (January 16, 2019): e11098. https://doi.org/10.2196/11098.
[110] Stratton, Samuel J. "Quasi-experimental design (pre-test and post-test studies) in prehospital and disaster research." *Prehospital and Disaster Medicine* 34, no. 6 (November 26, 2019): 573–74. https://doi.org/10.1017/s1049023x19005053.
[111] Stoyanov, Stoyan R, Leanne Hides, David J Kavanagh, and Hollie Wilson. "Development and validation of the user version of the mobile application rating scale (uMARS)." *JMIR mHealth and uHealth* 4, no. 2 (June 10, 2016): e72. https://doi.org/10.2196/mhealth.5849.
[112] Tsetsi, Eric, and Stephen A. Rains. "Smartphone internet access and use: Extending the digital divide and usage gap." *Mobile Media & Communication* 5, no. 3 (June 13, 2017): 239–55. https://doi.org/10.1177/2050157917708329.
[113] Liebe, Ulf, Klaus Glenk, Malte Oehlmann, and Jürgen Meyerhoff. "Does the use of mobile devices (tablets and smartphones) affect survey quality and choice behaviour in web surveys?" *Journal of Choice Modelling* 14 (March 2015): 17–31. https://doi.org/10.1016/j.jocm.2015.02.002.
[114] Wilmer, Henry H., Lauren E. Sherman, and Jason M. Chein. "Smartphones and cognition: A review of research exploring the links between mobile technology habits and cognitive functioning." *Frontiers in Psychology* 8 (April 25, 2017). https://doi.org/10.3389/fpsyg.2017.00605.
[115] Sung, Yao-Ting, Kuo-En Chang, and Tzu-Chien Liu. "The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis." *Computers & Education* 94 (March 2016): 252–75. https://doi.org/10.1016/j.compedu.2015.11.008.
[116] Mohr, David C., Michelle Nicole Burns, Stephen M. Schueller, Gregory Clarke, and Michael Klinkman. "Behavioral intervention technologies: Evidence review and recommendations for future research in mental health." *General Hospital Psychiatry* 35, no. 4 (July 2013): 332–38. https://doi.org/10.1016/j.genhosppsych.2013.03.008.
[117] Lorelli S. Nowell et al., "Thematic analysis," *International Journal of Qualitative Methods* 16, no. 1 (2017): 160940691773384, https://doi.org/10.1177/1609406917733847.
[118] Anja P. Tausch and Natalja Menold, "Methodological aspects of focus groups in health research," *Global Qualitative Nursing Research* 3 (2016): 233339361663046, https://doi.org/10.1177/2333393616630466
[119] Nowell, Lorelli S., Jill M. Norris, Deborah E. White, and Nancy J. Moules. "Thematic analysis." *International Journal of Qualitative Methods* 16, no. 1 (2017): 160940691773384. https://doi.org/10.1177/1609406917733847.
[120] Tausch, Anja P., and Natalja Menold. "Methodological aspects of focus groups in health research." *Global Qualitative Nursing Research* 3, no. 1 (2016): 233339361663046. https://doi.org/10.1177/2333393616630466.

[121] Hayatuddin, A. I. "Emotional management of female students in Malaysian institute of higher education." *Journal of Health and Quality of Life* 1, no. 1 (2024): 69-78.
[122] Elshobake, M. R. "Protection of the right to health care during the covid-19 pandemic in southeast asia: A retrospective and prospective analysis." *Journal of Health and Quality of Life* 1, no. 1 (2024): 49-68.
[123] Vijayam, B., Ping, L. S., Wen, W. J., Muzarpar, S., Rahim, A. A. A., Yee, P. J., and Sooriyapiragasam, L. "Validation of glycemic index values represented as bar graphs in scholarly articles for clinical nutrition application." *Journal of Health and Quality of Life* 1, no. 1 (2024):1-15.
[124] Esa, M., Muniandy, P., and Noor, N. A. S. B. M. "Awareness of mental health issues in Malaysian construction industry." *Journal of Health and Quality of Life* 1, no. 1 (2024): 21-48.
[125] Hamed, S. A., Hussain, M. R. B. M., Jani, H. H. M., Sabri, S. S. S. B., and Rusli, N. B. "The influence of physical workplace environment (PWE) for a healthy culture of employees." *Journal of Health and Quality of Life* 2, no. 1 (2024): 12-22.