

A CONCEPTUAL FRAMEWORK FOR IMPROVING THE EDUCATIONAL QUALITIES IN 4.0 ERA

by Fitri Nur Mahmudah

Submission date: 01-Oct-2020 09:23PM (UTC+0700)

Submission ID: 1402293258

File name: Improving_the_Quality_of_Educational_in_4.0_Era_-_Anonymous.docx (147.35K)

Word count: 5026

Character count: 28995

A CONCEPTUAL FRAMEWORK FOR IMPROVING THE EDUCATIONAL QUALITIES IN 4.0 ERA: A SYSTEMATIC LITERATURE REVIEW

Abstract

The purpose of writing this literature review is (1) to find out what programs can create superior human resources in the 4.0 era and (2) to create a new conceptual framework in education administration that can improve the quality of education in the 4.0 era. This article was written using the literature review method with an approach mapping review. The literature review process is carried out by searching for relevant articles, evaluating by extraction, analyzing, and then synthesizing. The database used in the reference search uses JSTOR and Springer Link. The result of this literature review is that educational programs that support the industrial revolution 4.0 are related to digital transformation in aspects of educational administration. The conceptual framework is made related to administration aspects which include HR, curriculum, learning, financing, infrastructure, public relations, and graduate competencies.

Keywords: educational administration, conceptual framework, quality of education, 4.0 era

INTRODUCTION

The world has entered the industrial era 4.0. This change is unavoidable, so it needs preparation in terms of adequate Human Resources (HR) in order to compete on a global scale. In this era, the boundaries between humans, machines and other resources are increasingly converging so that it impacts on various sectors of life (Lase, 2019, p.29). The key to preparing these human resources to be able to follow these developments lies in the education pathway (Lee, 2018, pp. 1255-1268).

Ideally, education that is carried out should be based on the response from industry needs. The applied curriculum should be able to open access in order to create human resources who are able to compete competitively and productively. Technological innovation is mandatory because it is very much needed in this era. The

alignment of people and technology is expected to be able to provide solutions and create new innovations. So that the human resources created are able to compete in the global arena.

Research results from the Institute for Administration Development show that the competitiveness of Indonesian workers is still lagging behind a number of ASEAN countries such as Thailand, Malaysia and Singapore. Singapore's ranking has risen due to its success in building high-tech infrastructure with skilled workforce, having friendly immigration laws, and successful efficiency in the business registration process.

Facing the big challenges of the 4.0 industrial revolution era, education is required to keep up with these changes. The changes are characterized by the use of digital technology in the learning process through a cyber system which is carried out in a sustainable manner. The end of the education process is what actually becomes a challenge in Indonesia, namely having qualified graduation of compete with the development of the era, competence and professionalism.

The need for adaptation by the entire educational community so that it is able to deal with existing conditions and does not complicate things when opportunities are not used. Education is only a component, where the main role is human resources. So that between educators and education have an important unity in determining the progress of the nation. A developed nation must have a good education system and can be accessed by all groups without exception. The essence of a revolutionary challenge 4.0 for education is how education can become an axis that can change and meet ever changing needs according to global conditions. Education is the key and the main form in increasing abilities, developing oneself in life, equal opportunities in education, and welfare.

The various conditions described above require a transitional administration that can manage education during the industrial revolution 4.0. This transition administration is the place for the transfer of knowledge with skills as required by shared challenges. Without administration in a administration of transformation and transition, there will never be an increase in quality in accordance with the vision and

mission of educational institutions. Therefore, the urgency of this literature review is compiled.

The literature review questions in this article are:

1. What the programs can create superior human resources in the 4.0 era?
2. What kind of conceptual framework for education administration can improve the quality of education in the 4.0 era?

LITERATURE REVIEW METHOD

The review method used in this paper is a systematic literature review. The type of review used is the mapping review (Grant & Booth, 2009, p.94). The Literature Review process is carried out to review with a transparent systematic review to search for published research articles, evaluate by extraction, analyze the next step is synthesizing (Robinson & Lowe, 2015, p.103). Literature Review conducted in September 2019 - January 2020.

Article Sources

The field of educational administration is a very broad field of study with various aspects of discourse and arable fields. The databases used in the article search were JSTOR and Springer Link, to ensure that the data sources reflected the two questions in this review literature. The reason for using these two databases is due to open access and ease in downloading articles so that it can be understood carefully about education administration in the 4.0 era, thus giving rise to new concept. In addition to using this database, the author also uses book chapters and textbooks that are relevant to the topic of literature reviews.

The initial search used the keyword "Educational Administration in 4.0 Era" and found many articles, namely nearly hundreds of thousands of articles from various databases. Therefore, the authors narrow down the themes in the search using keywords such as "curriculum in 4.0 era", "facilities in 4.0 era", "practice in educational administration in 4.0 era", "readiness for teachers in 4.0", "readiness for students in 4.0", "education in industry 4.0", "strategy teaching in 4.0", "human resources for readiness

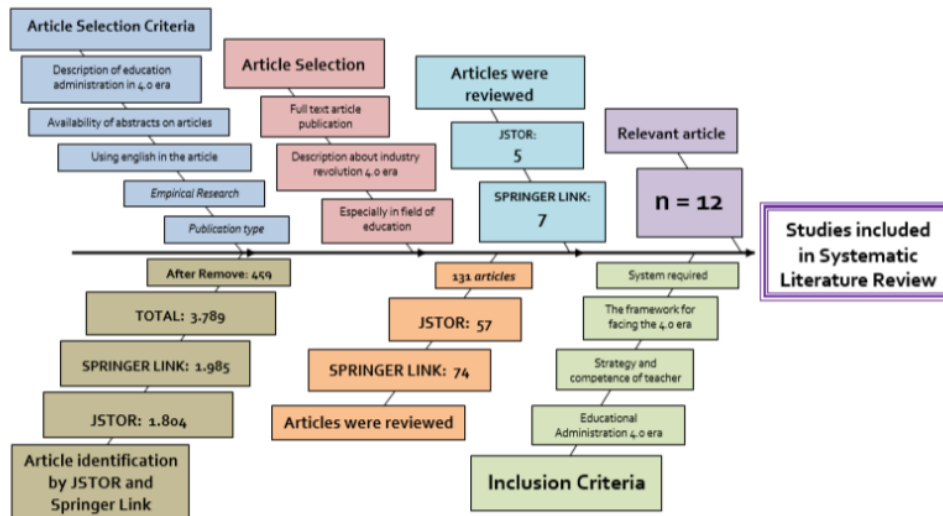
in 4.0 era", "framework of managing in industry 4.0", and "managing educational administration model".

Article Selection and Screening

Search for articles using the JSTOR database and Springer Link on the keywords mentioned above totaled 3,789 articles. Furthermore, these articles are selected and filtered to obtain articles that match this review literature. Articles irrelevant to the two literature review questions were identified based on discrepancies in the results and discussion of education administration in the 4.0 era.

This selection and screening stage is to analyze the paper title, keywords, abstract, problem background, research questions, results and discussion. This stage resulted in 459 articles for further in-depth review and reconsideration for selection and screening. The next stage is to get 12 published articles to be defended as literature review material as a complete review and synthesis in answering the questions in this study. The articles used in the search were limited to 2016 to 2020. The differences in the search stages for the articles used in this literature review are presented in Figure 1 and the presentation of the selected articles in table 1.

Figure 1. Article Selection and Screening



There are 12 articles in total that are relevant for literature review. Even though only a few articles were used, they focused on education administration with arable fields that existed in the 4.0 era. The most of articles excluded from this literature review discuss the administration of the 4.0 era in industry and companies in general. The article mostly discusses administration systems and administration strategies in improving the managerial quality of the company in increasing company profits or in handle-complete company work.

There were 12 articles after the selection process was carried out. Two of them are taken from the book chapter, which the author thinks is relevant in the systematic literature review of this. The process of searching for further references for this literature review study supports the findings discussed according to the two literature review questions which has been prepared to find new concepts or conceptual frameworks for education administration 4.0 era.

Data were collected using data extraction, including information on sample size/number of informants, research design, and research methods used. The data compilation refers to the two research questions that have been presented in the background/introduction. The authors organize the data collected to identify the answers made in this literature. Furthermore, designing a broader category by comparing the results of the literature.

Based on the theoretical background and references that have been surveyed, the author then makes administration to realize superior human resources in the 4.0 era. Next is to identify the competencies and strategies that need to be done education 4.0, and finally to create a conceptual framework for education administration in 4.0 era. Table 1, presents 12 articles selected for this literature review. Studies cover a variety of programs in education administration to improve the quality of education 4.0

Table 1. Overview of The Study

No	<i>Study</i>	<i>Method</i>
----	--------------	---------------

1	Baltaru & Nuho (2018)	761 HEIs, Quantitative
2	Chen, Daamen, Heurkens, & Verheul (2019)	Educators, Evaluating
3	Hoel & Mason (2018)	Two communities SLEs, Qualitative
4	Khlaif (2018)	30 schools, Qualitative
5	Gleason (2019)	Book Chapter
6	Hazelkorn (2018)	Universities, Qualitative
7	Ahad, Tripathi, & Agarwal (2018)	LAS for students in 4.0, Qualitative
8	Chung (2016)	PBL Strategies 4.0 Era, Qualitative
9	Verner <i>et al.</i> (2018)	Students for 4.0 Era, Qualitative
10	Cohen, Faccio, & Pilati (2019)	Readiness for Industry 4.0, Qualitative
11	Seretny & Gaur (2020)	MSM Model in 4.0 Era, Qualitative
12	Onar, Ustundag, Kadaifci, & Oztaysi (2018)	Education in Industry 4.0 Era, Qualitative

LITERATURE REVIEW RESULT AND DISCUSSION

LR 1 Education Administration Program to Realize Excellent Human Resources in 4.0 Era

The industrial revolution 4.0 is a concept that was first introduced by a German economist, Professor Klaus Schwab, in his book entitled “The Fourth Industrial Revolution” (Hoel & Mason, 2018, p. 25). Klaus revealed the stages of the industrial revolution, each of which can change people's lives and ways of working. Technological sophistication in the era of 4.0 has the potential to shift the role of humans as a resource if not equipped with qualified skills (Jandri et al., 2019, pp. 163-189). Therefore, increasing the role of human resources in facing the 4.0 era requires strengthening and development in the context of digitalization and culture. Industrial revolution 4.0 is a necessity marked by the emergence of the Internet of Things (IoT), big data, artificial intelligence, and cloud computing (Syakdiyah, 2019, pp. 165-168).

Responding to the challenges of revolution 4.0, there is a transformation program 4.0 (Johansson, 2019, pp. 177-200). This program is a program to accelerate

change in the field of digitization, human resource development, and cultural sharpening as a preparation for human resources to enter and welcome industry 4.0 (Kim, 2016, pp. 14-20). The main focus of the transformation program 4.0 in the field of education administration is to provide various field studies for students as well as apprenticeship programs in various educational and private (industrial) institutions, by providing targets as indicators of success.

This education administration program through digital transformation aims to create a habit of high discipline and to have strong competitiveness (Kirsch & Lennon, 2017, p. 11). Another objective that is relevant to this program is to make students as agents of change who can have a positive influence on the environment and society.

The digital transformation program in education administration that can create superior human resources in the 4.0 era is divided into three programs to accelerate change in educational institutions, (1) Digital Transformation; (2) HR transformation; and (3) Cultural Transformation (Enggar, 2019, p. 13). Accelerating changes in educational administration related to finance, students, infrastructure, educators and education personnel, curricula that can be processed through digital solutions. The main focus of this program consists of a digital campus, digital process, digital facilities, digital services, and digital learning.

This transformation of human resources (HR) is related to the acceleration of increasing HR competencies in general (Larsen, Terkelsen, & Carlsen, 2019, p. 259). Its main focus is to make vocational training and entrepreneurship a part of the educational curriculum (Lee, 2018, pp. 1255-1268). Cultural transformation is related to the acceleration of cultural cultivation in the attitude of doing work with a positive mindset, discipline, carefulness, enthusiasm, resilience, and sharpening de-radicalism so that it becomes a person who has a positive influence on the educational environment.

The implementation of the era 4.0 digital transformation program can involve the academic community such as principals and teachers in the school and university environment such as chancellors, deans, and students with trainers who are accompanied by coach trainers who are experts in their respective fields and who have been certified. The main targets in the use of digital in the educational environment

are all elements involved (Lim, Wang, & Graham, 2019, pp 1-12). This qualified understanding related to digital transformation in era 4.0 is able to answer the challenges of the times and can make a real contribution to creating good Indonesian human resources and competitiveness according to the principle of "Education for All" that quality education is not only owned by big cities and capable people.

Through digital distance learning and mobile based apps, it is hoped that educational goals for all parties can be achieved quickly, precisely, in a structured, and sustainable manner. This was done to build superior, creative, and innovative human resources (HR) in facing the industrial revolution era (Lin, 2019, p. 11). One of them, e-learning is a breakthrough in improving access to quality higher education throughout Indonesia.

Five excellent programs to build superior Indonesian human resources according to (Ainun, 2019, p. 5), namely: (1) ICT infrastructure; (2) Changes in Curriculum Content; (3) Competency Certification; (4) Industrial Collaboration; and (5) Entrepreneurial Spirit. The same thing was stated by Eiga Tarigan (2019, p.11) states that there are four strategic steps towards developing superior Indonesian human resources which must be the main priority in developing the quality of human resources, including (1) improving a good and quality education system; (2) strengthening the role of religion in social life in order to strengthen national identity and personality (character building); (3) increasing the capacity of human resources through various training, competencies, and coaching; and (4) community fostering and development, especially the younger generation.

The development of information and communication technology (ICT) infrastructure has a vital role, namely in an effort to accelerate Indonesia's development which is superior and able to compete at the global level in the era of revolution 4.0 (Rossi, 2019, pp. 284-293). The development of ICT in an educational institution is related to classroom learning. Educators can design in such a way the best learning material by using cyber school / university in developing connectivity through e-learning.

The various programs above, in general it can be concluded that the programs that can be used for education administration in realizing superior human resources

in the 4.0 era are as follows: (1) Improvement and development of qualified human resources skills; (2) The role of the government in changing learning methods according to the needs of the challenges of the revolution 4.0; (3) Carrying education 4.0; (4) Information and communication technology for learning in the era of the industrial revolution 4.0; (5) Support for artificial intelligence facilities and infrastructure; (6) Solutions for educational institutions facing the industrial revolution 4.0; (7) Revision of the curriculum by adding five competencies (ability to think critically, to have creativity and innovative abilities, good communication skills and abilities, cooperation ability, and high self-confidence).

The learning planning above needs to be synchronized with changes in curriculum content. By integrating basic skills regarding technology, data, and 'humanity', it is the same as preparing graduates who are competent and able to face the challenges of the world of work in the 4.0 era (Mccartney, Metcalfe, Mccartney, & Metcalfe, 2018, 1-15). Furthermore, increasing the competence of students through learning needs to be upgraded according to field conditions so that collaboration with other institutions is needed to increase the relevance of the curriculum according to the needs of the 4.0 era (Meshkat, Teklu, Hunchak, Taaac-em, & Health, 2018, pp. 1-8). Close cooperation between educational institutions and the world of work aims to be able to fill the gap between theory and practice. The competence and creativity of these graduates are the focus of human resource development in schools and colleges. A professional and skilled workforce demands/is a factor excellence for a nation in facing global competition.

The demands of the 4.0 era competency do not produce graduates who are ready to work according to development and needs but can also increase creativity and entrepreneurial spirit. Competence in creating jobs is the result of learning innovations that are important in creating a creative industry in the digital era.

LR 2 A Conceptual Framework of Education Administration to Improving the Quality of Education in 4.0 Era

This section discusses how education administration in the 4.0 era. The articles selected answer this second literature review question discuss various concepts designed to manage and organize education according to the needs and developments of the era. One of the changes in education administration that is formed is by improving human resources (Husnufofik, 2019, pp. 160-164). The concept of change is what will later create a conceptual and change system that human resources who are involved in the world of education need to do in the face of the 4.0 era.

Education administration is a series of processes throughout the activities of greeting in the field of education which includes planning, implementation, monitoring, financing and evaluation by utilizing available facilities, both human resources and other resources. In general, educational administration has concerns related to student affairs, curriculum, finance, infrastructure, education and education personnel, and relations with the community.

Providing quality education will be able to produce educational efficiency. This is shown when the educational process is surrounded by environmental and supportive factors (Zhuang Tengteng, Cheung Alan C.K., Lau Wilfred W.F., 2019, pp. 576-611). Likewise, when they are themselves challenges-changing needs of country economically and socially (Faisal, Martin, 2019, pp. 2-29). The implementation of well-managed education in the 4.0 era will certainly produce good quality (Ahad, Tripathi, & Agarwal, 2018, pp. 2-16).

The most fundamental thing in education administration is changing the mindset (Baltaru & Nuho, 2018, pp. 213-229). Furthermore, educational institutions, both schools and colleges, hone, develop and change the administration system model (Chen, Daamen, Heurkens, & Verheul, 2019, pp.54-61). Likewise, providing adequate facilities as needed that can be used to take advantage of the latest technology in administration and learning systems (Chung, 2016, pp. 285-307).

The concept of education administration in the 4.0 era that is important for educational institutions to pay attention to is the existence of competence, skills, communication, and networking. The same thing was also conveyed by (Hammond,

2016, pp. 555-566) that to develop an education administration system, two things are needed, namely internationalization and global competitiveness. In the current era of 4.0, it is necessary international levels. 4.0 era competition can be used as study material to strategic respond for increasing competition's global, through increasingly innovative management. The most common strategy to respond to the progress of the 4.0 industrial revolution is by investing in human resources. Improving the quality of human resources (HR) is an important concern in facing the era of globalization (Mahmudah, 2016, pp. 77-87). Especially in a multidimensional critical atmosphere, the entire academic community needs the support of various parties to face free competition.

When the human resources are superior and have qualified skills in the tough competition of the 4.0 era, the next step is to use operational technology and information through big data. Big data itself is a technology system introduced to cope with the "information explosion" in line with the growing ecosystem of mobile and internet users. This growth greatly affects the volume and type of data that continues to increase significantly in cyberspace. Big data is one of the strategies that must be mastered so that an educator can easily research and analyze the abilities of his students, not only individually but collectively in one class or at the institutional level (Rungfamai, 2018, pp. 75-80). Big data can also be utilized by using Scele and Siak-ng which are the application of e-learning to facilitate data collection and collection.

Another thing with curriculum administration in the 4.0 era. Facing this 4.0 era, you must be alert to adjust to the various developments that exist. There is a need for reforms, capacity building, professionalism, dynamic curriculum, reliable infrastructure, as well as up-to-date learning technology in the 4.0 era.

Figure 2. A Conceptual Framework of Educational Administration in Improving the Quality of Era 4.0



Figure 1 above is the findings from the literature review. The education administration process to improve the quality of education in the 4.0 era can be seen from the seven components which include HR, curriculum, learning, financing, facilities and infrastructure, public relations, and graduate competencies. Human Resources (HR) era 4.0 emphasizes readiness, skills, investment (human capital investment), and digital services. The most important thing about HR development is the existence of adequate and sufficient investment to be able to make HR superior and professionalism without limits in work and in dealing with and operating equipment according to the needs of the world of work.

The 4.0 era curriculum for educational institutions focuses on digital processes. Curriculums can be designed according to the skills and competence needs of graduates. The digital process focuses on the processes that are carried out starting from the preparation, utilization, implementation, and evaluation of the digital curriculum. So that the connectivity between what is expected by schools and the needs of challenges can be mutually sustainable without a miss match between educational institutions and the challenges of the industrial revolution 4.0.

Learning that needs to be improved in the face of the development of the 4.0 era is by means of learning preparation through digital learning, implementing e-learning, and most importantly the human learning interface (HLI). Koper (2014, p. 14) introduces the concept of Human Learning Interface (HLI), which is a set of interaction mechanisms that are exposed to people outside of learning that can be used to control, provide stimulation, and facilitate the learning process to catch up.

Funding in educational institutions in the era of 4.0 needs to be emphasized on the use of a systemized financial system such as digital budgeting and e-money systems. A system designed for all forms of payment activities and digital versions of purchases without any physical form of money. The effectiveness of this usage can be seen when services in the global world have been leading and waiting by using a sophisticated system without having to be manual and conventional.

Facilities and infrastructure that need to be improved to reach the point of quality of education in the 4.0 era are digital facilities, IoT, Big data, Artificial

Intelligence, Cloud Computing. Public relations (PR) is a central role for the development of educational institutions and assists schools in strengthening the vision and mission in accordance with the goals of educational institutions. Public relations is important because of networking and collaboration.

Graduate competence is a component that needs to be considered to ensure that graduates of educational institutions have superior quality knowledge and skills, which are accompanied by good character. The competence of this graduate is one of the studies that must be considered in an education. Without good output and being able to compete in the changing era, education can be said to be of less quality.

CONCLUSION

Changes in the era that have now entered the industrial revolution 4.0 are a natural thing. This fairness requires excessive attention to be used and utilized in competitive advantage through education. The important point of implementing education is good administration. Cultivated fields that are the important foundation of the implementation of education are the main concerns. The findings of the literature review above have found that the main studies of education administration in the 4.0 era in their involvement in improving the quality of education include: Human Resources, Curriculum, Learning, Financing, Infrastructure, Public Relations, and Graduate Competencies.

Each of these fields has an important role with one another. Collaborative is expected to be able to make every cultivated field able to make a real contribution, so that educational institutions do not just carry out education based on laws and regulations, but also have a spirit that is able to develop and bridge the mindset with changes in the development of the 4.0 era.

The indicators of success for each of the cultivated fields are not yet measurable. One thing is certain, when educational institutions are able to implement digital transformation in every educational activity, that will be the basis for educational institutions to be able to compete and face challenges according to the needs of the 4.0 industrial revolution.

REFERENCES

- Ahad, M. A., Tripathi, G., & Agarwal, P. (2018). Learning analytics for IoE based educational model using deep learning techniques: architecture, challenges and applications. *Smart Learning Environments*, 5(7), 2–16.
- Ainun. (2019). Program Unggulan Guna Membangun Indonesia Unggul.
- Baltaru, R., & Nuho, Y. (2018). Administrators in higher education: organizational expansion in a transforming institution. *Higher Education*, 3(4), 213–229.
- Chen, Y., Daamen, T. A., Heurkens, E. W. T. M., & Verheul, W. J. (2019). Interdisciplinary and experiential learning in urban development management education. *International Journal of Technology and Design Education*, 3(4), 54–61. <https://doi.org/10.1007/s10798-019-09541-5>
- Chung, P. (2016). Influence of problem-based learning strategy on enhancing student's industrial oriented competences learned: an action research on learning weblog analysis. *International Journal of Technology and Design Education*, 26(4), 285–307. <https://doi.org/10.1007/s10798-015-9306-3>
- Cohen, Y., Faccio, M., & Pilati, F. (2019). Design and management of digital manufacturing and assembly systems in the Industry 4.0 era. *The International Journal of Advanced Manufacturing Technology*, 3(105), 3565–3577.
- Eiga Tarigan. (2019). Langkah Strategis Menuju Pembangunan SDM Indonesia Unggul.
- Enggar, Y. (2019). Mewujudkan SDM Unggul Lewat Program “Transformasi 4.0.”
- Faisal, Martin, S. N. (2019). Science education in Indonesia: past, present, and future. *Asia Pacific Journal of Education*, 5(4), 2–29.
- Gleason, N. W. (2019). Singapore's Higher Education Systems in the Era of the Fourth Industrial Revolution: Preparing Lifelong Learners (hal. 145–169). <https://doi.org/10.1007/978-981-13-0194-0>
- Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal*, 26(2), 91–108. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>
- Hammond, C. D. (2016). Internationalization, nationalism, and global competitiveness: a comparison of approaches to higher education in China and Japan. *Asia Pacific Education Review*, 17(4), 555–566. <https://doi.org/10.1007/s12564-016-9459-0>
- Hazelkorn, E. (2018). The Accountability and Transparency Agenda: Emerging Issues in the Global Era. *European Higher Education Area: The Impact of Past and Future Policies*, 5(4), 423–439. <https://doi.org/10.1007/978-3-319-77407-7>
- Hoel, T., & Mason, J. (2018). Standards for smart education – towards a development framework. *Smart Learning Environments*, 5(4), 3.

- Husnufofik, Z. (2019). A Systematic Review on Sustainable Human Resource Management: A Framework for Managing Training in The Indonesian Police Force. *Advances in Social Science, Education and Humanities Research*, 317(1), 160–164.
- Jandri, P., Ryberg, T., Knox, J., Hayes, S., Suoranta, J., Smith, M., ... Asher, G. (2019). Postdigital Dialogue. *Postdigital Science and Education*, 1(2), 163–189.
- Johansson, S. (2019). Teacher specialization and student perceived instructional quality : what are the relationships to student reading achievement ? *Educational Assessment, Evaluation and Accountability*, 31(3), 177–200.
- Khlaif, Z. N. (2018). Transforming learning for the smart learning paradigm : lessons learned from the Palestinian initiative. *Smart Learning Environments*, 5(12), 2–21.
- Kim, J. (2016). Development of a global lifelong learning index for future education. *Asia Pacific Education Review*, 3(2), 14–20. <https://doi.org/10.1007/s12564-016-9445-6>
- Kirsch, I., & Lennon, M. L. (2017). PIAAC : a new design for a new era. *Large-scale Assessments in Education*, 5(4), 11. <https://doi.org/10.1186/s40536-017-0046-6>
- Larsen, C. M., Terkelsen, A. S., & Carlsen, A. F. (2019). Methods for teaching evidence-based practice : a scoping review. *Larsen et al. BMC Medical Education*, 19(4), 259.
- Lee, K. (2018). Everyone already has their community beyond the screen : reconceptualizing online learning and expanding boundaries. *Educational Technology Research and Development*, 66(5), 1255–1268. <https://doi.org/10.1007/s11423-018-9613-y>
- Lim, C. P., Wang, T., & Graham, C. (2019). Driving , sustaining and scaling up blended learning practices in higher education institutions : a proposed framework. *Innovation and Education*, 3(4), 1–12. <https://doi.org/10.1186/s42862-019-0002-0>
- Lin, J. (2019). From a lecturer to a researcher : a three- stage process of science teachers ' professional development in mainland China. *Asia-Pacific Science Education*, 7(5), 11.
- Mahmudah, F. N. (2016). Keefektifan Human Capital Investment Pendidikan Tenaga Kependidikan di Universitas Negeri Yogyakarta. *Jurnal Akuntabilitas Manajemen Pendidikan*, 4(1), 77–87.
- Mccartney, D. M., Metcalfe, A. S., Mccartney, D. M., & Metcalfe, A. S. (2018). Corporatization of higher education through internationalization : the emergence of pathway colleges in Canada. *Tertiary Education and Management*, 13(4), 1–15. <https://doi.org/10.1080/13583883.2018.1439997>
- Meshkat, N., Teklu, S., Hunchak, C., Taaac-em, O., & Health, G. (2018). Design and Implementation of a postgraduate curriculum to support Ethiopia ' s first emergency medicine residency training program : the Toronto Addis Ababa Academic Collaboration in Emergency Medicine (TAAAC-EM). *BMC Medical Education*, 18(3), 1–8.

- Onar, S. C., Ustundag, A., Kadaifci, Ç., & Oztaysi, B. (2018). The Changing Role of Engineering Education in Industry 4.0 Era. In *Industry 4.0: Managing The Digital Transformation, Springer Series in Advanced Manufacturing* (hal. 137-151).
- Robinson, P., & Lowe, J. (2015). Literature reviews vs systematic reviews. *Public Health Association of Australia*, 39(2), 103. <https://doi.org/10.1111/1753-6405.12393>
- Rossi, P. G. (2019). National Policies and Educational Technology: a Synopsis of Trends and Perspectives from Five Countries. *TechTrends*, 63(5), 284-293.
- Rungfamai, K. (2018). State, university, and society: higher educational development and university functions in shaping modern Thailand. *Higher Education*, 5(6), 75-80.
- Seretny, M., & Gaur, D. (2020). The Model of Sustainable Marketing as a Responsible Approach to Marketing in the Era of Industry 4.0. *Sustainable Development and Social Responsibility*, 1(6), 283-289. <https://doi.org/10.1007/978-3-030-32922-8>
- Syakdiyah, A. (2019). Active Learner Strategies in Era of Disruption: a Literature Review. *International Conference on Progressive Civil Society*, 317(1), 165-168.
- Verner, I., Cuperman, D., Romm, T., Reitman, M., Chong, S. K., & Gong, Z. (2018). Intelligent Robotics in High School: An Educational Paradigm for the Industry 4.0 Era. *Intelligent Robotics in High School*, 1(5), 824-832. <https://doi.org/10.1007/978-3-030-11932-4>
- Zhuang Teng, Cheung Alan C.K., Lau Wilfred W.F., T. Y. (2019). Development and Validation of an Instrument to Measure STEM Undergraduate Students' Comprehensive Educational Process. *Front. Educ. China*, 14(4), 575-611.

A CONCEPTUAL FRAMEWORK FOR IMPROVING THE EDUCATIONAL QUALITIES IN 4.0 ERA

ORIGINALITY REPORT

0%

SIMILARITY INDEX

0%

INTERNET SOURCES

0%

PUBLICATIONS

0%

STUDENT PAPERS

PRIMARY SOURCES

Exclude quotes On

Exclude bibliography On

Exclude matches < 1%