

## Medicial Education Strategy In The Era of Digitalization and Disruption

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### ABSTRACT

**Background:** This article aims to (1) examine the current condition of education in the digitalization and disruption era and (2) examine medical education strategies in the digitalization and disruption era. Writing scientific papers is based on library research, whose object of study uses library data in the form of books as a data source.

**Content:** Based on the literature review, it was found that: (1) global medical education currently uses the SPICES strategy (student-centered learning, problem-based, integrated, community-based, elective, and systematic), accompanied by nine educational trends; (2) SPICES is a medical education strategy that will produce graduate profiles that refer to World Health Organization (WHO) and World Organization of Family Doctor (WONCA) conference agreements. A doctor must have six-star doctor characteristics, namely: care provider, decision makers, communicators, community leaders, managers as well as creators and innovators; (2) the minimum standard of competence for doctors in Indonesia, constitute of seven areas of graduate competency namely; has noble professionalism, is always aware and develops himself, can communicate effectively, is reliable in managing information, always has a scientific basis in medical science, has clinical skills and can manage health problems well.

**Conclusion:** A special strategy for medical education is required in the era of digitalization and disruption by applying a lifelong education approach. Indonesian medical education uses the SPICES strategy to create six-star doctors and master the seven defined competency areas.

**Key words:** Digitalization, disruption, medical education



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## **Introduction**

The global development of the world of education continues to increase in line with advances in science and technology. One of the most extraordinary advances, namely digital technology in the era of disruption (disruption), has penetrated (pervasiveness) space and time so that the world seems to be without boundaries. In the education sector, the acceleration of digital technology is increasingly driven by extraordinary events, namely when the world, including more than 189 countries, has been infected with COVID-19 since the end of 2019, which was later declared a pandemic.

At the beginning of the Covid-19 pandemic, the world of education was also affected. However, it then rose, existed, and even experienced extraordinary leaps due to the transition from face-to-face (conventional) methods to massive online based on digital technology. In this regard, all elements of global governance (including Indonesia) are taking strategic steps in responding to the new era of education. So the implementation of education continues to be reformed; the goal is to guarantee the quality of education, and even the quality must be better than in previous times. Education in medicine and health also adapts to current conditions, where digital-based technology continues to be developed.

Based on the Ministry of Education and Culture's report (2020), since March 2020, this institution has made various regulations that adjust various policies and provide various suggestions and solutions during the Covid-19 pandemic. In April 2020, the Ministry of Education in Indonesia provided free quotas, launched the Guru Berbagi portal, and relaxed using "bantuan operasional sekolah" (BOS) and "bantuan operasional pendidikan" (BOP) funds to pay tea honorariums, and online learning. Next in May s.d. In June 2020, the Ministry of Education and Culture, among other things: provided Single Tuition Fee assistance for around 410 thousand students and BOS funds. Following July s.d. August 2020, they launched the curriculum in the emergency conditions of the Covid-19 pandemic and provided learning modules for early childhood education programs and elementary education levels. The next policy in September to December 2020, provided subsidized internet quota assistance for students, teachers, university students, and lecturers. This situation means the Indonesian government has been remarkably anticipatory in responding to changes by preparing various regulations. One of the new regulations or policies was made through the Guidelines for Developing a Higher Education Curriculum in the Industrial Age 4.0 to Support Free Learning-Independent Campus.<sup>1</sup> Various Medical Faculties in Indonesia have implemented the intended policy, at the Faculty of Medicine, University of Gorontalo

(Fakultas Kedokteran Universitas Negeri Gorontalo, FK UNG), for example, has issued Chancellor's Regulation Number 02 of 2020 concerning Academic Regulations at Universitas Negeri Gorontalo, which was then followed up by compiling a Competency-Based Curriculum Policy (Revised) by the Dean of FK UNG in 2021. This policy was made as a guideline for implementing Bachelor of Medicine education at Universitas Negeri Gorontalo and is expected to be used up to the Medical Profession Program.

Even though the government has issued various policies, the results of research at several tertiary institutions between 2020 – 2022 show that the post-Covid-19 online learning system in the era of digitalization and disruption is seen as still lacking in efficiency and effectiveness, particularly those related to 'social networks' internet. This incident then has an impact on the quality of student learning outcomes. In this regard, examining the Medical Education Strategy in the Era of Digitalization and Disruption is necessary. This article examines the current conditions in medical education and the proper strategies to implement in the digitalization and disruption era.

### **Digitalization and Disruption Era**

Until the end of 2022, experts see the world experiencing a technological or industrial revolution in the fourth wave (4.0). This is known as the digitalization revolution or cyber-physical system. The concept of implementing the industrial revolution 4.0 describes a series of major changes that have occurred in industry in the world. The concept popularized by Klaus Schwab, an economist from Germany, is centered on automation involving information technology so that effectiveness and efficiency in a work environment will increase. In this sophisticated 4.0 era, some technologies are very popular and have been implemented by various groups: geolocation, robotics, the Internet of Things (IoT), smart things, Big Data, Artificial Intelligence (AI), Cloud Computing, and Additive Manufacturing.<sup>2</sup> Even a big step from Japan, namely announcing the possibility of revolutionizing the concept of Industry 5.0, which is referred to as the era of society's awakening. The main focus is not only on technology but on combining and utilizing it with various aspects, including human aspects.<sup>3</sup>

From the aspect of etymology, the word digital is taken from the Greek digitus, which means the fingers or toes of a person whose number is ten (10). Digitalization is a change process from analog mechanical and electronic technology to digital technology. From the 1980s until the end of this decade, digitizing technology has continued to evolve. This matter is a manifestation of globalization, namely an integrated process carried out globally due to the exchange of world views, thoughts, products, and various other socio-cultural aspects due to improvements in internet telecommunication infrastructure and modes of transportation.<sup>4</sup>

Regarding the term disruption (English), which later became a standard term in Indonesia (disruption), it is contained in the Big Indonesian Dictionary (Kamus Besar Bahasa Indonesia, KBBI), which means 'things uprooted from their roots.' In the English – Indonesian Dictionary, Echols and Sadily (2000:189) means translated as 'disturbance,' 'chaos.' This means that disruption is an innovation or a threat that will replace the entire old system with a new way, system, or idea. Disruption replaces old, physical-mechanical technology with digital technology that produces something new, more efficient, and more useful (Kasali, 2017 p. 34). Popular terms in various circles, such as disruption, disruptive innovation, disruptive technology, disruptive mindset, and disruptive leader, have become a habit and are very familiar to the general public, especially the millennial generation and the educated. Rhenald Kasali, in his book *Disruption*, states that the term "disruption" originally appeared in the context of business, investment, and finance. However, its influence expanded in many areas of life: politics, entertainment, government, society, leadership, and education. In the context of education, it is then termed by experts as an educational disruption.<sup>5,6</sup>

Based on the descriptions and views of experts, it shows that the industrial revolution 4.0 had a significant impact on all lines of human life. This also means that in the digital and disruption era, digital-based technology is necessary for humanity in all sectors, including education.

### **The World of Education from Conventional to the Era of Digitalization and Disruption**

Hidayat (2019: 3) defined education as an effort to develop the potential that God has bestowed on humanity so that it can humanize humans, which at the Islamic level is called *al-insan kamil* (whole human being; plenary; *kaffah*). Furthermore, he said that the process of teaching, learning (*ta'lim* and *tadris*), cleansing and habituation (*tahdzib* and *ta'dib*), and *tadrib* (practice) can be realized through education.

Some experts believe that the principle of education is the acquisition of knowledge or knowledge in rational reasoning. The principle of education also means that it is a gradual process of bringing life changes in a positive direction and can help improve one's thinking. Education is a basic need for a nation to become developed, independent, and civilized. On a more micro scale, if individuals neglect their education, stupidity, backwardness, and poverty of insight will certainly befall them. This means a fatal mistake if the state, region, or every individual gives priority to, let alone ignores, education. Many facts show the high degree reachable for knowledgeable people (*Allah will exalt those who believe among you and those who are given knowledge of several degrees: QS al-MujJadilah: 11*). In the Islamic

perspective education is, first and foremost, the Prophet Muhammad SAW received the first revelation related to "education; Study; reading = Iqra'." Students in madrasas or pesantren are always taught pearls of wisdom; adagio or mahfudzat, for example: "utlubul ilma even though it is bissin" = seek knowledge even though it reaches China or "utlubul 'ilma minal mahdi ilal lahdi", seek knowledge from the cradle to the grave.

This Islamic concept became actual again, particularly with the publication of Paul Lengard's book 'An Introduction to life long education' in 1970, which was later developed by UNESCO.<sup>7</sup> The meaning of Education from an Islamic perspective that has been practiced since 15 centuries ago, is very much in line with the views of education experts (non-Muslim-secular), particularly with the birth of the conception of lifelong Education. One of the philosophers who conforms to this Islamic perspective is the educational theory of Ivan Illich (1926-2002). As a humanist and religious (Catholic) thinker, Illich tends to define Education in a broad sense. For him, Education equals life. According to Kartikasari (2018: 61) and Sutirna and Samsudin, 2015: 24). Education is a matter that exists in human life and is the influence of a process of growth and development. Education can be meaningful as a person's learning experience throughout life. Illich stated that: "education is a learning experience that takes place in various environments and processes throughout the ages."<sup>7,8</sup>

The conception of lifelong education emphasizes that the educational process takes place continuously from the time a person is born until he dies, whether implemented through formal, non-formal, or informal education. From an Islamic perspective, Lifelong Education is not only an idea or concept but has become part of the behavior of life. Nevertheless, in a modern (western) concept, recommendations have been received to become a parent in educational innovation efforts.<sup>9</sup> Related to the concept of long-life learning, the European Commission, which consists of 35 countries, made a study in 2002 regarding indicators of the quality of Lifelong Education (European Commission. Directorate General for Education and Culture, 2002: 7-8). The commission's report states that there are 15 indicators of the quality of Lifelong Education which can be grouped into four categories and indicators. Area A: which is referred to as Skills, Competencies, and Attitude. This area includes a) Literacy, b) Numeracy, and c) New Skills in the Learning Society. Area B: This area is called Access and Participation, including: a) Access to Lifelong Learning and b) Participation in Lifelong Learning. Area C: referred to as Resources for Lifelong Learning, includes: a) Investment in Lifelong Learning, b) Educators and Training, and c) ICT in Learning. Area D: referred to as Strategies and System Development, including: a) Strategies of Lifelong Learning, b) Coherence of Supply, and c) Counseling and Guidance.

The Lifelong Education Approach from the European Commission is stated as a policy strategy for building citizenship, social cohesion, employment, and fulfilling personal needs. In the Indonesian context, the meaning of education prioritizes religious values and culture but remains sensitive to the times, as stated in Law Number 20 of 2003 concerning the National Education System. This regulation emphasizes that national education in the Republic of Indonesia is based on Pancasila and the 1945 Constitution. A very principled affirmation is the mention: "rooted in religious values, national culture and responsive to the demands of changing times." This situation shows that the meaning of education globally and in the Indonesian context is compatible or under religious (Islamic) principles. It can also be interpreted that national education in Indonesia prioritizes the values of religiosity and culture and continues to pay attention to technological modernization that continues to develop.

In the context of education in the era of digitalization and disruption (industrial revolution 4.0), its main feature is the use of digital technology in the teaching and learning process (cyber system) so that the inheritance of knowledge and competencies can take place continuously without always having to meet face to face (offline) in the classroom. In other words, teaching materials can reach students anytime without being limited by space and time. There are several strategies or ways of implementing education (including education in the field of medicine) in the era of digitalization and disruption (technological revolution 4.0 and society 5.0, namely, (1) in the teaching-learning process, digital technology devices should be prepared in advance. This statement makes one benchmark in the era of digitalization, and disruption is the foundation of technology; (2) a curriculum following current conditions is urgently needed. This means that there is only medical education with modernizing the curriculum under the demands of the times and (3) Ensuring lecturers who are competent in applying information technology to learning.<sup>10</sup> Previous study reported that the application of digital technology requires educators (teachers, lecturers) to develop knowledge (hardware and software), pedagogy (teaching methods), and lesson content). This condition means that this point makes it imperative that teaching staff (also educational staff) be competent and smart.<sup>11</sup>

There are at least three main pillars in formulating an educational strategy that can be adopted in medical education in the digitalization and disruption era, namely: (1) preparation of modern technological infrastructure or facilities; (2) the presence of a curriculum that is continuously updated; and (3) the intelligence or skills of teaching and educational staff in applying IT. On the third point, students do not mention their student elements because, in this era, students are generally the latest generation who are technology literate.

Several studies report the implementation of online learning/education processes in tertiary institutions, including the Faculty of Medicine, in the era of digitalization and disruption after the Covid-19 pandemic. For example, the results of research by Eka Ramadanti et al. from the State University of Malang (2021) show that online learning models need fixing for students. For example, there are extra fees for data packages, and learning could be more optimal, impacting the Rating Index value.<sup>12</sup> Subsequent research from the Bandung Institute of Technology (ITB) by Permana and Wiyanti (2021) concluded that: changes in the learning system from offline to online (Distance Learning system) are seen as not being effective and efficient because of the disparity in education in Indonesia, particularly at the tertiary level.<sup>13</sup> Another study from the Faculty of Medicine, University of Sam Ratulangi Manado shows that internet connectivity impacts the quality of learning. Apart from that, it is constrained by the availability of supporting tools and materials and laboratory skill modules that still need to be standardized and related to psychological readiness and devices in terms of preparing for online learning.<sup>14</sup>

Research reveals that after the Covid-19 pandemic, the IT-based (online) learning process has yet to provide optimal results. Concerning the three research results, at Nurtanio University, Bandung, online lecture activities are carried out through a page provided by the campus designed by BTSI (Bureau of Technology and Information Systems) called f-learning. In order to streamline the learning process and anticipate problems with IT applications, some lecturers use applications on the Play Store by utilizing Google Classroom, Schoology, Zoom, and Edmodo.<sup>15</sup> This case shows that, although there are many obstacles in the learning process by utilizing information technology, there are tips that can be implemented as practiced by Nurtanio University, Bandung. In fact, since 2020, the Ministry of Education has launched Merdeka Learning Kampus Merdeka (MB-KM), where one of the learning characteristics is student-centered or Student-Centered Learning (SCL). In this study, the things that are put forward are creativity, capacity, personality, student needs, and student independence. SCL refers to constructivism learning theory, where students must construct their knowledge to learn effectively.<sup>1</sup>

It cannot be denied that the current era of digital technology has greatly influenced the world of education and influenced many countries to invest in education technology. Apart from developed countries, developing countries like Indonesia continue to make IT-based education policies and programs. Countries that are seen as (poor) like Uganda also make educational policies on a technology basis.<sup>10</sup>

## **Strategy for Medical Education in the Era of Digitalization and Disruption**

Education in the perspective of medical education has been regulated in Law Number 20 of 2013 concerning Medical Education. The regulation states that there are two types of education, namely academic and professional education, which produce competent graduates. The derivation of rules related to medical education, as outlined in the Minister of Research and Technology Regulation Number 18 of 2018 concerning National Standards for Medical Education, states that there are 17 (seventeen) standards for professional medical education, including a) graduate competency standards (covering attitude competence, knowledge, and skills); b) standard content (a minimum criterion for the depth and breadth of learning materials); c) process standards (among other things: the characteristics of the learning process include interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centered). In addition, process standards focus on: the academic education process is carried out with student-centered learning strategies based on individual and community health problems and scientific and technological developments that are horizontally and vertically integrated, selective, structured, and systematic.

The definition of strategy has been put forward by many experts, including Schumaker & Deshler, (1992) as quoted <https://cambriancollege>, states that "A learning strategy is an individual's way of organizing and using a particular set of skills in order to learn content or accomplish other tasks more effectively and efficiently in school as well as in non-academic settings". This means that the learning strategy is a way of organizing and using certain skills to complete tasks effectively and efficiently in educational institutions.

Prior to implementing the student-centered learning strategy, problem-based, integrated, community-based, elective, and systematic (SPICES), Hardem (1982) said that the old curriculum was the Plexner model (1911), the nature of this model was: teacher-centered on information gathering, discipline-based, hospital-based, uniform, and internship based. That means the focus of the medical education curriculum is to produce doctors who can work in hospitals by prioritizing curative and rehabilitative services. This curriculum model cannot answer public health problems and does not respond to science and technology. In its development, a new approach to the medical education curriculum was put forward with the following characteristics: student-centered learning, problem-based, integrated, community-based, elective, and systematic (SPICES). The SPICES strategy approach then becomes the basis or principle for compiling the Competency-Based Curriculum (CBC) (Saiful Batubara, 2012: 2). SPICES is also following the Indonesian Doctor's Professional Education Standards (SPPDI). Assessment of the application of the SPICES model in the educational curriculum is



very important in determining the direction of ongoing learning.<sup>16</sup>

Regarding the implementation of the SPICES strategy, a study has been carried out, for example, at the Faculty of Medicine UNHAS Makassar by Iskandar (2022: 27). The results of his research show that learning strategies using the SPICES approach, the accumulative proportions of the assessment are clearly described. However, it was found that there were weaknesses, including; the curriculum is only prepared by the team and internal stakeholders; there is no clear description of the roles, functions, and duties of team members; milestones are not yet clear; and there is no detailed description of the implementation of the SPICES components in the implementation of the curriculum.<sup>17</sup> The limitations experienced by several medical faculties in Indonesia are also experienced by FK UNG, where there are limited capabilities in curriculum development strategies. Elements of infrastructure and systems also need to be revised. This matter was realized from the start of the pioneering establishment of the UNG FK in 2019. However, the faculty of medicine management and UNG continued to try to minimize these limitations by conducting training for educators/lecturers.

There are nine Trends in Medical Education Strategies. First, minimum competency standards with the need for general competence. General competencies include bioethics and skills (communication, interpersonal, and information technology). Second, Community orientation in medical education (COME). This trend, among others, is based on public needs, health protocol, and disease prevention. Third, Self-directed learning/learner-centered learning). The learning model is education in adults (adult learning). Fourth, Problem-based learning (PBL) and Task-Based Learning (TBL) are the trend or tendency toward embodying self-directed and learner-centered learning. Fifth, early clinical contact/exposure) contact with patients from the initial assessment. At this point, an integrated medical discipline approach is needed with other sciences. Sixth, Continuing professional development, meaning that medical education is sustainable and of all time. Seventh, Unification between education and practice. That education at the Faculty of Medicine is legally obligatory to access community health service centers. Eighth, the Best evidence in medical education is that medical decisions must be based on evidence (scientific facts), not on non-scientific conjectures. Ninth, Information, and communication technology, it is mandatory to utilize ICT in various aspects, such as services, research, and education.<sup>18</sup>

Regarding the SPICES Medical Education Strategy and the nine trends in medical education, it is a necessity that cannot be negotiated anymore because the use of these strategies is an inseparable part of the principles of benefit, humanity, balance, responsibility,

equality, curriculum suitability, and affirmation, truth—science as stated in the Law on Medical Education. In addition, it is believed that the medical education strategy will produce graduate profiles according to WHO and WONCA (World Organization of Family Doctors) standards which have been set since 1994, namely the character of a six-star doctor, which includes: care provider, decision maker, communicator, community leader, manager as well as creator and innovator.

Regarding the SPICES strategy, which is used as the basis for compiling the Competency-Based Curriculum (CBC) in the medical field, it is deemed necessary to pay attention to Kelvin's view (2020: 3), saying that the higher education curriculum should also refer to standard-based education and outcome-based education. In this regard, the Indonesian Medical Council (KKI), based on the mandate of Law Number 29 of 2004, has ratified the Professional Education Standards and Competency Standards for Indonesian Doctors, whereby a doctor in Indonesia has a minimum graduate competency standard based on 7 (seven) competency areas, namely; has noble professionalism, is always aware and develops himself, can communicate effectively, is reliable in managing information, always has a scientific basis in medical science, has clinical skills and can manage health problems well. Furthermore, KKI believes that "in response to change, it takes a way of thinking that is adaptive, anticipatory, creative, innovative. The value and benefits of these changes are expected to solve various problems and build communication, teamwork, networking, and the support of parties."<sup>19,20</sup>

Furthermore, Suwandi said that along with the era of Industry and Technology 4.0 and Society 5.0, curriculum design must be able to respond to various challenges. Even the updated curriculum produces graduates who have new literacy competencies (data, technology, and noble human literacy). At the same time, literacy includes various intelligences (IQ, EQ, SQ) accompanied by adaptability to developments in the flow of technology and information.<sup>21</sup>

The best educational strategy is not easy but certainly not something impossible to apply. In the end, it can be emphasized that when entering the era of digitalization and disruption, an innovative medical education strategy is urgently needed while prioritizing religious values, national cultural roots, and keeping up with the times, in this case, science and technology. This matter is relevant to the educational goals set out in Law Number 20 of 2003 concerning the National Education System.<sup>7,22</sup>

## **Conclusion**

Techniques for implementing modern education in the era of digitalization and

disruption, which need special attention, include: (1) Preparing digital technology devices for the implementation of the Teaching and Learning Process, (2) Preparing a curriculum that is per the times (FK uses CBC). , and (3) Ensuring teaching staff have skills in utilizing IT for learning. In addition, the lifelong education approach is a religious (Islamic) concept later adopted by the European Commission Directorate General for Education and Culture as a policy strategy for developing citizenship, social cohesion, employment, and fulfilling personal needs. Meanwhile, global medical education uses the SPICES strategy (student-centered learning, problem-based, integrated, community-based, elective, and systematic), accompanied by nine educational trends. SPICES is a medical education strategy that will produce graduate profiles that refer to (1) WHO and WONCA (World Organization of Family Doctors) conference agreements, namely a doctor has the character of a six-star doctor, namely: care provider, decision maker, communicator, community leader, manager as well as creator and innovator; (2) the minimum standard of competence for doctors in Indonesia, namely seven areas of graduate competency namely; has noble professionalism, is always aware and develops himself, is able to communicate effectively, is reliable in managing information, always has a scientific basis in medical science, has clinical skills and can manage health problems well.

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