

Reactualization of Education Post-Covid 19 Pandemics: Responding to the Industrial Revolution 4.0 on Education in Indonesia

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Abstract. The Covid-19 pandemic presents its challenges to the world of education. There is a distance learning in the last two years. It was accompanied by the emergence of a new trend of the Industrial Revolution 4.0. In addition, education in Indonesia has not fully enlightened the public on its value and benefits. This condition is proven by the complexity of educational problems, mainly from the low quality of graduates and the low relevance of education to the world of work. Officials and political parties often politicize education. How can education respond to the industrial revolution 4.0, which brings significant changes that impact learning and teaching governance? For this reason, there is a need for the Re-actualization of National Education.

Keywords: education, actualization, industrial revolution 4.0

1 Introduction

The Covid-19 pandemic has forced school opening policies to be suspended for approximately two years. Educational attainment in Indonesia is still not optimal without a pandemic condition, as seen in the Program for International Student Assessment (PISA) score by the OECD in 2018. Indonesia is ranked 72 out of 77 countries for reading competence, 72 out of 78 countries for Mathematics, and 70th out of 78 countries for science, with scores that have stagnated in the last 10 to 15 years.

School closures due to the pandemic can potentially create learning loss, where when schools are closed for three months, children are predicted to lose the equivalent of more than one year of learning (Kaffenberger, 2020).

This situation is unavoidable and the Distance Learning (PJJ) process. This is a necessity because there is no other option. Apart from the various challenges in implementing PJJ, strategies and efforts are needed in managing the PJJ process to support students to learn optimally while protecting them from the dangers of exposure to Covid-19.

Furthermore, it requires understanding from various parties that PJJ is not only an alternative so that students can continue to study even though the physical school building is closed. PJJ must also present a meaningful learning process for students, teachers, and parents relevant to the need for post-pandemic education.

So, we need a new perspective on what kind of education students need after the pandemic. Awareness is required about the importance of making various breakthroughs, not only in the education system but also in the daily learning process lived by students, teachers, and parents. In presenting educational innovations, we must remember the importance of paying attention to the different contexts and needs in each region, school, and individual.

This different situation after the Covid-19 pandemic has brought us a different perspective and done things differently. The goal is not merely to encourage children to achieve more but to survive

amid difficult situations and enjoy an educational process for meaningful outcomes for Indonesian children.

Education is a process in which a person acquires knowledge (knowledge acquisition), develops abilities/skills (skill developments), attitudes, or changes attitudes (attitude change). Education is transforming students to achieve certain things due to the educational process they follow. As part of society, education has a dual function: a social function and an individual function. Its social position is to help each individual become a more effective member of society by providing a collective experience of the past and present, while the individual function is to prepare themselves to be more productive in facing the future.

Carter V. Good in Arif Rohman (2009) divides two notions of education science. First, the science of education is understood as the art of educating or the art of teaching. This kind of understanding means that the science of education contains a series of practical tips for educating; second, education is understood as a scientific discipline that studies educational phenomena with scientific principles (the science of education).

As for some other views on education, we can see such as:

1. Crows & Crows, Education is a process that contains various activities suitable for individuals for their social life and helps pass on customs, culture, and social institutions from generation to generation.
2. John Dewey, Education is a process of intellectually and emotionally forming fundamental skills towards nature and fellow human beings.
3. JJ Rousseau P., Education is an effort to provide provisions that do not exist in childhood but are needed in adulthood.
4. J. Gielen and S. Strasser, Education is all the efforts of adults in their association with children to lead physical and spiritual development towards maturity.
5. George F. Kneller, sees education in three areas, namely:
 - a. Broadly speaking, education refers to an action or experience that has an influence and is related to the growth or development of the mind, character, and individual physical abilities.
 - b. The technical meaning is education as a process in which society, through educational institutions (schools, colleges, or other institutions), intentionally transforms its cultural heritage into knowledge, values, and skills from generation to generation.
 - c. Meaning of Results, that education is what we can get through learning (knowledge, values, and skills)
 (Dirto Hadisusanto, et al, 1995).
6. UU no. 20 of 2003 concerning National Education System, Education is a conscious effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious, spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state.

2 Educational Problems

The portrait of education in Indonesia in the next five years is shrouded in various urgent problems to get the attention of all components of the nation. The authors summarize these problems from the 2015-2019 Ministry of Education and Culture Strategic Plan as follows:

1. The Role of Educational Development Actors is not yet Optimal,
In primary education, the role of parents is often still limited to administrative matters and the provision of private facilities for students only; in secondary education, students are not yet subject to education or are not actively involved in the learning process; strengthening the role of teachers and education personnel still places too much emphasis on improving the quality, competence, and professionalism of teachers. In addition, enhancing the role of actors at all education levels is still not synergized as part of the education ecosystem.
2. The Role of Cultural Actors has not been Significant in Preserving Culture
Dependence on the government and local government's role and assistance is still relatively high. Many of the initiations of cultural actors are still carried out individually and lack synergy.

3. Not all residents have access to quality PAUD access services
That not all PAUD-age children have received education services, as shown by the achievement of the new PAUD GER of 68.1% in 2014.
4. Implementing 12 Years of Compulsory Education with Not Maximum Quality
When the 12-Year Compulsory Education was established as one of the priority agendas for education development, there were still some problems in implementing the 9-Year Compulsory Education that had not been resolved. These problems include:
 - a. Fulfillment of the right to quality primary education services has not been maximized
Although the achievement of the GER for primary education in 2012-2013 has reached above 100%, there are still problems in terms of equity, both in terms of spatial and economic levels. From a spatial perspective, 146 districts and cities (29.4%) still have SD NERs below 95%, while 169 districts/cities (34%) still have SMP GERs below 95%. Regarding the economic level, the participation rate of the population aged 13-15 years is very high
 - b. Not all residents have access to quality secondary education services
Not all children aged 16-18 have received quality education services, as shown in the SMA/MA/SMK APK, which is still low at 80% in 2014. Many sub-districts still do not yet have SMA/MA/vocational schools. Dropout bag. Currently, 947 sub-districts, or 13.9% of sub-districts, do not yet have SMA/MA/SMK. Likewise, the difference in the ability to continue school among the economically weak is still very high, and the physical limitations of the school are still the main obstacles to the implementation of education.
 - c. The relevance of vocational secondary education to the needs of the world of work has not been maximized
In this case, the results of the education services provided by SMK have not been as expected; this is evident from the unemployment rate of SMK graduates, which is relatively lower compared to SMA graduates, namely 9.10% for SMA and 7.21% for SMK in February 2014. In addition, also because the average amount of income is not too different between high school and vocational high school graduates. This means there is no significant perception of the world of work between SMK and SMA graduates.
5. Improving the Quality of Learning is not Maximum
The achievement of the quality of education in Indonesia, which is still far below the achievements of developed countries or even below Indonesia's neighboring countries, is a record in improving the quality of education in Indonesia. One of them can be seen that the Mathematics PISA scores of Indonesian students in 2018 showed that 70% of Indonesian students were still below the minimum competency for reading, 71% of students were still below the minimum competency for mathematics, and 60% of students were still below the competency level. Minimum for science.
Based on these data, the Ministry of Education and Culture conducted a study, and the results were findings about the three main factors that caused the low quality of learning in Indonesia, namely:
 - a. Low-quality assurance of education services
Until 2013 only 68.7% SD/MI and 62.5% SMP/MTs had been accredited with a minimum B score. This shows that the quality of primary education services must continue to be improved. The same is true for SMA and SMK. Only 73.5% of SMA/MA have been accredited with a minimum of B, and only 48.2% of vocational expertise competencies are certified with a minimum of B. Based on these data, it is clear that the quality of education services in Indonesia still does not meet the National Education Standards (SNP). In other words, education services are still deficient.
 - b. Weak implementation of the curriculum
The implementation of the 2013 Curriculum in 2014 was side by side with the 2006 Curriculum, causing several problems. The 2013 curriculum is considered by some to have not been sufficiently studied and has not undergone adequate trials to be applied so massively; the limitations of teaching materials and the common understanding of

educators, principals, and parents on the implementation of the 2013 curriculum so that it is counter-productive in the world of education.

c. Weak educational assessment system

A comprehensive and reliable education assessment system has not yet been fully developed. This can be seen, among others, from the absence of (i) the reliability and validity of the national examination system; (ii) the lack of efforts to strengthen independent educational assessment institutions; (iii) the absence of a review of the role, structure and resources of the education assessment center; (iv) the results of monitoring student learning outcomes have not been utilized as information on improving the quality of learning on an ongoing basis; and (v) the limited ability of educators to provide formative assessment.

6. Improvement of Teacher Management, Teacher Education, and Reform of Educational Personnel Education Institutions (LPTK)

a. The number and distribution of teachers still need to be managed better

This can be seen from the following data:

- 1) The distribution of teachers in the regions is not evenly distributed, which is caused by:
 - a) limited capacity of district and city governments to effectively and efficiently manage teachers' recruitment, placement, and quality improvement.
 - b) lack of commitment to enforcement of regulations on teacher appointments based on strict quality criteria and actual needs in districts/cities.
 - c) the efficient use of teachers has not been realized by improving the teacher-student ratio and maximizing the teaching load.
 - d) the lack of cooperation between LPTKs and all levels of government to ensure the quality and equitable distribution of teachers
- 2) The ratio of educators to students nationally has been good/adequate.
- 3) The teacher recruitment process has not been integrated between regions, so many parts have an excess of teachers while others experience a shortage.
- 4) Meeting the shortage of teachers in 3T areas will be challenging to implement due to the limited availability of teachers.

b. The quality, competence, and professionalism of teachers still need to be improved

Improving teachers' quality, competence, and professionalism still has to have improved because, until now, there is no linear relationship between increasing the qualifications and certification of the teaching profession on student learning outcomes. This is partly due to:

- 1) The teacher competency test system has not yet been implemented as part of the student learning outcome assessment process;
- 2) There has not been a valid, reliable, transparent, and sustainable teacher performance assessment;
- 3) design and alignment of disciplines have not yet been considered as the basis for improving academic qualifications and teacher certification; as well as Teacher Continuous Professional Development (PPB) has not yet been implemented.

One of the critical factors in assessing teacher performance is the average teacher absence rate which in 2013 reached 10% (ACDP Study), where the teacher absence rate was higher for (i) male teachers; (ii) teachers who teach at more than one school; (iii) teachers teaching in remote schools; (iv) schools with inadequate infrastructure; (v) schools that have not yet reached the MSS; (vi) the principal who is also often absent and does not become a role model; (vii) schools that the district education office rarely visits; and (viii) schools with less active school committees. In schools where teacher absence rates are high, student absenteeism rates are also high.

c. Lack of LPTK capacity in providing quality teachers

The limited quality of education services by LPTKs has resulted in no significant improvement in teacher quality. These limitations are caused, among others, by:

- 1) There is no comprehensive LPTK reform to improve the quality of teacher education;

- 2) The lack of involvement of LPTKs in the planning and teacher procurement process based on an analysis of teacher needs per region (district and city);
 - 3) The unavailability of a quality assurance mechanism for prospective students who enter LPTKs through a selection process based on a merit system;
 - 4) Less than the optimal implementation of teacher induction and monitoring programs;
 - 5) The teacher training curriculum that is responsive to actual needs has not yet been developed; and
 - 6) Professional teacher education has not yet been implemented for new teacher candidates through the scholarship and boarding pattern.
7. Improving Work Skills and Strengthening Adult Education (Public Education) is not yet Maximum
- The number of standardized courses and training institutions does not guarantee an increase in the quality of education, work skills, and the absorption of students in the world of work. This is caused, among other things, by
- a. The Indonesian National Qualifications Framework (KKNI) and the Indonesian National Work Competency Standards (SKKNI) have not yet been implemented;
 - b. There is no BLK revitalization taking into account the efficiency and effectiveness of training;
 - c. The low quality of non-formal education, particularly skills courses, for the young workforce;
 - d. There is no guarantee of standardization of services for educational institutions and skills training;
 - e. The lack of harmony in education and job training carried out by the government and the private sector is seen from the needs of regional development and DUDI.
8. Eradication of Uneven Literacy
- The success of meeting the target of Dakkar's declaration on education for all still leaves problems in terms of equity. The literacy achievement has not been evenly distributed in all provinces, especially in the frontier, outermost, and disadvantaged (3T) areas. For example, it can be mentioned that the literacy rate in Papua Province is still high, which reaches 30.93%. This is due to the limited ability of the people who administer the literacy program and geographical conditions that are very far away.
9. The improvement of family education is not as expected
- The family program implemented through parental education has only reached 45% of districts and cities. In addition, the achievement of success is not sufficient because it is only limited to stakeholders to provide increased insight into the importance of the role of parents in educating children as early as possible, increasing family food security, preventing destructive behavior, understanding nutrition and healthy lifestyles and implementing gender mainstreaming.
10. The Low Quality of Reading Skills and the Extinction of the Use of Regional Language and Literature
- Obstacles in improving the quality of students' reading skills are influenced by the competence of educators, quality standards for the use of learning languages, learning systems, and language and literature learning resources. Furthermore, a USAID study (2014) showed that.
- a. On average, 47.2% of students in grades 1 and 2 in Indonesia are ready to advance to grade 3 because they read fluently and understand the meaning. The rest as much.
 - b. Slow in reading slowly to understand the meaning of reading by 26.3%
 - c. The beginner group is 20.7%, this beginner class is a combination of fluent and slow readers who doesn't understand the meaning; and
 - d. there are 3% classified as non-readers (non-readers) because even though they have been in school for two years, they do not yet know letters.
- Nationally, the low reading ability of students is exacerbated by the wide literacy gap between the western and eastern regions of Indonesia and between urban and rural areas within the district. They are generally students from low-income families whose parents are also

illiterate, the public is a single mother tongue speaker, and attends primary schools in rural and remote areas.

11. Symptoms of Fading Student Character and National Identity

The increase in narcotics cases, fights between students and public groups, and promiscuity can be interpreted as a symptom of the waning of understanding, appreciation, and practice of the noble values of the nation's culture.

For this reason, the Government has made various efforts to increase public understanding of the importance of student character and national identity based on diversity and local wisdom and their application in daily life. However, these efforts are facing various problems that are still being met, among others, the tendency to:

- a. Decreased understanding, appreciation, and practice of Pancasila values in everyday life;
- b. The decline in the quality of the use of the Indonesian language and a sense of love for domestic products;
- c. Low awareness of cultural diversity, historical values, and local wisdom as well as respect for customs, traditions, and beliefs;
- d. Decreased fighting power and work culture (work ethic) as well as tolerance and tolerance for differences that can trigger social conflicts;
- e. Strengthening the values of primordialism and fundamentalism can threaten the nation's disintegration.

12. Utilization of the Education Budget has not been Effective and Efficient

The public has not thoroughly enjoyed implementing the 20% APBN budget. The process of using the education budget from the APBN through the regional transfer mechanism has not been fully transparent. It has not directly impacted the quality of education services in the regions.

Although government spending on education has almost tripled since 2001, there are still inefficiencies in education financing, among others,

- a. Uneven management and distribution of teachers;
- b. Unbalanced ratio of teachers and students;
- c. Utilization of BOS that has not been signed with improving the quality of learning;
- d. The use of transfer spending to the regions through the DAU and DAK for the education sector has not been optimal; and

13. Not Optimal Organizational Governance of the Ministry of Education and Culture

That the governance of the Ministry of Education and Culture must carry out Organizational Reframing to be able to improve quality services to the public, both administratively and other completeness, especially those related to services for teachers and education personnel who still have a lot of homework, both about distribution, recruitment, teachers and education personnel. Honorary, the division of professional organizations, the irregularity of professional organizations, regulations on the protection and supremacy of law against floating teachers, and many other problems related to teacher problems.

3 The New Paradigm of National Education

Looking at the conditions of these complex problems, we can be sure that this is a picture of a national education crisis; for that, the author tries to reflect on the ideas developed by Prof. Dr. HAR Tilaar, M.Sc. Ed, entitled "The New Paradigm of National Education," published in 2006 in Jakarta by Rineka Cipta, is presented in this discussion.

That is the life crisis that befell the Indonesian people during the pre-new and new order eras, including the national education crisis. In this case, education has been thrown out of culture. It has become merely a tool of an economic order or an instrument of a group of rulers to realize their ideals which are not always to the demands of society (p.6). Reflecting on this fact, entering the reform era requires the preparation of a new educational paradigm oriented toward the realization of Indonesian civil society (p.27-31). Civil society is a society that respects values and all of its human rights, which can be realized through a new paradigm of national education, which begins with the process of repositioning and re-actualizing education (p.52-61)

Forming a new Indonesian society, namely Indonesian civil society, requires new paradigms because the old paradigms are no longer by the demands of the times. The government's efforts to develop democratic individuals and organizations need various educational praxis ideas. The condition of a closed, centralized society and shutting down the initiative of human thinking is not an expectation from education. Therefore, the birth of a new national education paradigm resulting from the struggle for reform must have a strong spirit to be better able to answer internal and global challenges. This paradigm has a solid foundation to make Indonesia a united and democratic nation, not to be divided into political maps and conflict maps. The role of education, which was previously centralized in management and curriculum preparation, must be changed and adapted to the demands of democratic education.

Likewise, in facing a competitive and innovative global life, the educational process must be able to develop the ability to compete in cooperation, develop attitudes, improve quality and be the right solution to various academic problems. The new educational paradigm is not education that can kill diversity, but teaching that can develop variety towards creating an Indonesian society that is united on the richness of the diversity of the Indonesian people and nation. The new paradigm of national education must be outlined and elaborated in various gradual and sustainable federal education development programs.

For that, the best steps that the government must take are:

1. National Education Reposition

The new paradigm of national education to create a new Indonesian society, namely Indonesian civil society, the position of national education must be adjusted to these demands. In determining the role of national education, several concepts need to be developed and elaborated further in real programs and activities. The images are as follows:

- a. Redefinition of national education.

The definition of education must be more complementary. In this context, education needs to carry out three basic studies: First, education cannot be limited to mere schooling because by limiting education as schooling, education will be alienated from real life, and society will be thrown from its responsibilities in education. Educational formulations emphasizing formal and non-formal education need further refinement by positioning informal education in real terms as the holder of an essential role in shaping human behavior in open global life. Second, the old paradigm oriented to the development of student academic intelligence was developed based on multiple intelligences through a broad and flexible curriculum program in formal and non-formal education. Furthermore, education must have a clear goal that education is not just an effort to make people bright but, more importantly, how to make people cultured. The purpose of education is not only to educate humans but to culture humans (educated and civilized human beings). Thus, the educational process can be formulated as a process of hominization and humanization of a person in a cultured family, school, and public environment, shaping the present and future human beings.

- b. Education is an empowerment process.

So far, we have seen how education has been reduced as a process to pass EBTANAS/UN/UNBK or UMPTN and other names that are more inclined to the cognitive domain but must be directed to how to form a moral and civilized society as mandated by the 1945 Constitution in which education as a golden bridge for the intellectual life of the nation. Education is an effort to empower humans. Empowered humans are humans who can think creatively, who are independent, and who can build themselves and their communities. An empowered human is a productive human. It is not education whose processes, methodologies, and systems are to produce robotic humans and can only receive instructions and directions from above, nor is society empowered by an authoritarian system.

- c. Education is a civilizing process.

Education must be a civilizing process directed at developing an independent personality as a member of a democratic society. With the three concepts mentioned above, which must and need to be translated into real programs and activities, the new national education position will produce education with high accountability from the public

because it is born from public needs and handled by the public itself. This is what is meant by "public-based management."

2. National Education Realization

After we can reposition (reposition) national education, then the next step is to re-actualize the national education system. So far, we have seen how national education has stagnated because it cannot respond to society's demands, especially the spirit of reform towards a clean government, moral leaders, and programs for the people and not the people for programs. National education can actualize the real needs of society as mandated by the 1945 Constitution, namely an intelligent public and nation. Actualization of national education with a new position and a new paradigm in realizing a contemporary Indonesian society by prioritizing the following basic principles:

a. Public participation in managing their education (public-based education).

That a democratic society is a society that actively organizes its education, today we see how national education has become a bureaucratic affair in which the public does not participate in the process. One of the consequences of public participation to revive a democratic society is public-based education (CBE). CBE demands that the public (parents, local public leaders, national leaders), the world of work, and the industrial world must participate in fostering their education. With the desire for decentralization both within government and in managing the real needs of society, the decentralization of education has become a demand. Thus, the education management structure must be adapted to the active participation of the public in its implementation. Education rooted in the public also means participation and control from the district. The old social institutions must be strengthened, and new ones must be established to carry out this task. Furthermore, public participation demands autonomy from educational institutions. The independence of educational institutions means that these educational institutions are free from the confines of the bureaucracy and become professional institutions with clear responsibilities. The autonomy of educational institutions does not reduce public participation in education provision. The two components need to be woven in mutually beneficial cooperation. The public assists in implementing and controlling its impleperformancele activities within the educational institution are carried out by authorized and professional personnel. Experiments and educational innovations are given the broadest possible place in the autonomy of educational institutions (school-based education management).

b. Democratization of the educational process.

The democratization of education is a review of programs at various levels. The centralized and heavy curriculum must be reviewed according to the public's needs. Of course, as a unitary state, a national curriculum is needed. However, the national curriculum is not binding and provides the broadest possible place for a decentralized curriculum to meet the needs of local communities. Integration between the national and local curricula must be carried out on the principle of a productive balance. The Law on Regional Autonomy and the Law on Fiscal Balance between the Central Government and Local Governments are great local educational innovation opportunities.

c. Professional educational resources.

To carry out decentralization, democratization, and problems in education in Indonesia, skilled and professional personnel must support the education process. We have to fix the issues of recruitment, distribution of teachers, LPTKs, and less suitable styles that occurred during the New Order era. Likewise, national education caregivers do not develop quality capabilities in their management. The educational process not directed at developing critical, innovative thinking has no relevance, and accountability must be eliminated immediately. A curriculum that still keeps students away from their involvement with real life must be a priority for change so that education is not increasingly alienated from the process of cultural development. The keys to implementing this principle include education and professional development of the teaching profession. Our teacher education institutions are fragile, seen from various sides, both in terms of the preparation of knowledge required in the information age and

the 21st-century learning public, as well as from the very minimal professional practice of our educators.

d. Adequate Supporting Educational Facilities and Resources

Based on the problems stated above, it turns out that we have achieved quite a lot, and the investment in educational development is relatively significant. However, from a macro perspective, our education investment is relatively low in the Asian region. In this regard, the role of the public (private education) needs to be reviewed. Various studies have shown that remote inputs financing primary school education in Indonesia are among the lowest. This needs to be questioned because, in a country like Vietnam, with a lower per capita income than Indonesia, the public provides participation almost the same as funding the government. Viewed from this perspective, private education participation needs to be encouraged and appreciated and not hindered. Or insulted.

Articulation of the Education System by the Spirit of Decentralization. In our experience so far, our education levels are boxed according to bureaucratic arrangements. A very extreme form of higher education does not have a downward orientation but an upward orientation. Thus our higher education has no relevance to the needs of regional development or the development of local communities. Also, our higher education is not related to the level of education below it. Secondary education is also separated from primary education due to bureaucratic arrangements. This is very unfavorable for the development of the local public and culture because it is not supported synergistically by the education system. In the spirit of autonomy, the articulation of various types and levels of education in the regions needs to be immediately built so that the education system supports the formation of a democratic society that starts from the bottom (grass root). Thus the actualization of national education as a civilizing process will be faster and more successful.

4 The Impact of the Industrial Revolution 4.0 on Education in Indonesia

Information and technology affect school activities very massively. New information and knowledge spread quickly and are accessible to anyone who needs it. Education is experiencing very significant disruption. The role of the teacher, who has been the only provider of knowledge, has shifted away from him more or less. In the future, the role and presence of the teacher in the classroom will be more challenging and require a very high level of creativity.

The era of the industrial revolution 4.0 is a tough challenge for Indonesian teachers. Quoting Jack Ma at the 2018 World Economic Forum annual meeting, education is the big challenge of this century. If we don't change how we educate and teach, we will experience significant difficulties in the next 30 years. Education and learning that is loaded with knowledge content override the attitude and skill content as currently implemented, which will produce students who are unable to compete with machines. The dominance of knowledge in education and learning must be changed so that in the future young Indonesians can outperform machine intelligence and be wise in using devices for their benefit.

Are teachers in Indonesia ready to face the era of the industrial revolution 4.0 when they are still busy with the burden of delivering knowledge and adding various administrative tasks? Currently, teachers feel burdened with a curriculum and administrative burden that is too dense, so they no longer have time left to allow students to explore their creative potential to produce original works. As a result, students' social interaction is limited, their creative power is shackled, and the ability to grow their noble character is less.

The era of the industrial revolution 4.0 will impact the role of education, especially on the part of educators. If educators are still a transmitter of knowledge, they will lose their position along with technological developments and changes in learning methods. This condition must be overcome by increasing the competence of educators who support knowledge for exploration and creation through independent learning.

The 21st century is marked by the era of the industrial revolution 4.0 as the century of openness or globalization, meaning that human life in the 21st century undergoes fundamental changes that are different from the order of life in the previous century. It is said that the 21st century is a century that demands quality in all human endeavors and results. The 21st century naturally requires quality human resources, which professionally managed institutions produce to deliver superior results. These all-new demands call for various breakthroughs in thinking, drafting concepts, and actions. In other words, the

philosopher Khun needs a new paradigm to deal with new challenges. According to the philosopher Khun, all efforts will fail if these new challenges are faced using the old paradigm. The new challenge demands a breakthrough thinking process if what is desired is the quality output that can compete with the work in an open world.

In the context of 21st-century learning, learning that applies creativity, critical thinking, cooperation, communication skills, public, and character skills, it must be maintained that as an educational institution, students still need technical skills. Utilizing various learning activities that support i4.0 is a must with a resource-sharing model with anyone and anywhere; classroom and lab learning with augmented virtual materials, interactive, challenging, and content-rich learning is not just complete.

This condition is contrary to the current implementation of education and learning, which is limited by the walls of classrooms that do not allow students to explore the natural educational environment, namely family, public, and school. Teachers who organize learning are always rich in adat (as usual), not rich in kudu (as they should be), and poor in innovation and creation. The learning process in schools is nothing more than a routine of repetition and conveying (informative) content of knowledge that does not hone students to develop creativity, taste, initiative, and work as well as social awareness. The teacher held this year's lesson the same as in previous years.

The world of education in the industrial revolution era is in the knowledge age with the acceleration of the extraordinary increase in knowledge. This accelerated increase in expertise is supported by the application of digital media and technology called the information superhighway (Gates, 1996). The style of learning activities in the knowledge age must be adapted to the needs of the knowledge age. Learning materials must provide a more authentic design for facing challenges where students can collaborate to create solutions to solve learning problems. Problem-solving leads to questions and searches for answers by students, which can then be searched for problem-solving in the context of learning using available information resources (Trilling and Hood, 1999: 21).

The demands for a change in the 21st-century human mindset mentioned above also demand a massive difference in national education. We know our education is a legacy of the old education system whose contents are memorizing facts without meaning. Changing the Indonesian education system is not an easy job. The Indonesian education system is one of the world's largest, including about 30 million students, 200 thousand educational institutions, and 4 million educators, spread over an area almost the size of the European continent. But this change is a must if we do not want to be crushed by the changing global era.

P21 (Partnership for 21st Century Learning) develops a learning framework in the 21st century that requires students to have skills, knowledge, and abilities in the fields of technology, media, information, learning, and innovation skills, as well as life and career skills (P21, 2015). This framework also describes the skills, knowledge, and expertise that must be mastered so that students can be successful in life and work. Look at the Figure 1.

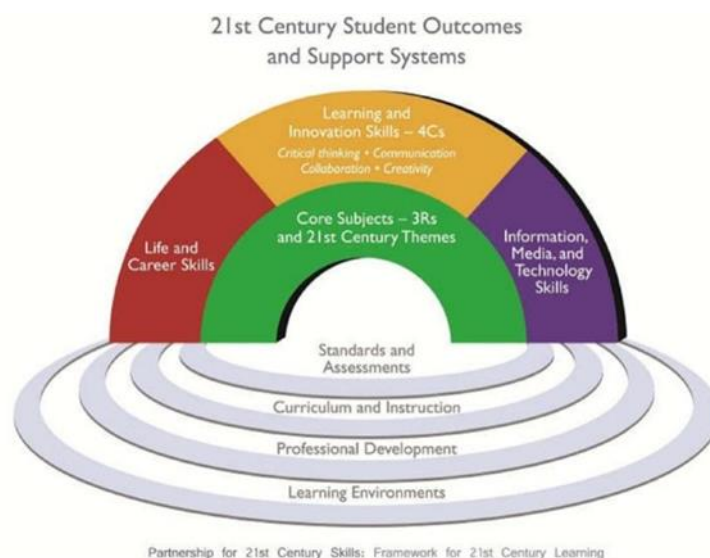


Figure 1: 21st century learning framework

In line with this, the Ministry of Education and Culture has formulated that the 21st-century learning paradigm emphasizes the ability of students to find out from various sources, develop problems, think analytically and collaborate and collaborate in solving problems (Ministry of Education and Culture Research and Development, 2013). The explanation of the 21st century learning framework according to (BSNP: 2010) is as follows: (a) Critical-Thinking and Problem-Solving Skills , able to think critically, laterally, and systemically, especially in the context of problem solving; (b) The ability to communicate and collaborate (Communication and Collaboration Skills), able to communicate and collaborate effectively with various parties; (c) Ability to create and renew (Creativity and Innovation Skills), able to develop their creativity to produce various innovative breakthroughs; (d) Information and Communication Technology Literacy , able to utilize information and communication technology to improve performance and daily activities; (e) Contextual Learning Skills , able to carry out contextual independent learning activities as part of personal development, and (f) Information and media literacy skills, able to understand and use various communication media to convey various ideas and carry out collaborative activities and interactions with various parties.



Figure 2: 21st century learning paradigm change

To face learning in the 21st century, everyone must have critical thinking skills, knowledge and abilities of digital literacy, information literacy, media literacy, and mastering information and communication technology (Frydenberg & Andone, 2011)

The 21st-century skills are (1) life and career skills, (2) learning and innovation skills, and (3) Information media and technology skills. These three skills are summarized in a scheme called the 21st-century knowledge-skills rainbow (Trilling and Fadel, 2009). The plan was adopted by the non-profit organization p21, which develops a 21st-century education framework throughout the world through the www.p21.org site based in the state of Tuscon, America. The concept of 21st-century skills and core subject 3R are described below. Figure 3 shows a rainbow scheme of 21st-century skills.

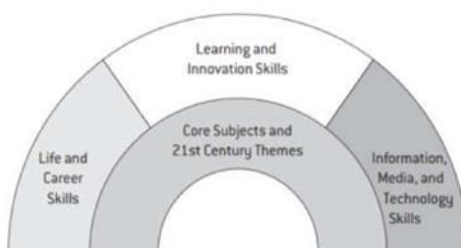


Figure3: Scheme of 21st-century skills

The scheme developed by 21st-century learning is clarified by adding the 3R core subject. In the context of education, 3R stands for reading, writing, and arithmetic; it takes a strong "R" pronunciation for each word. From the subject of reading and writing, the idea of modern education emerged, namely literacy, which is used to learn to understand concepts through words. From the matter of arithmetic emerged modern education related to numbers, which means understanding numbers through mathematics. In education, no single term relevant to literacy and numeracy can express the ability to make things (writing). 3R, adapted from the 18th and 19th centuries, is equivalent to the functional literacy, numeracy, and ICT skills in today's modern education system. Furthermore, to clarify the function of the core subject of 3R in the context of 21st-century skills, 3R is translated into life and career skills, learning innovation skills, and information media and technology skills.

Meanwhile, to realize 21st-century knowledge skills, the Ministry of Education and Culture applies the 2013 Revised Curriculum 2017. This curriculum is expected to be able to answer criticisms and problems when the 2013 Curriculum (Kurtilas) is implemented. To be sure, the 2013 curriculum and the 2017 revision still emphasize the importance of 21st Century Skills.

21st Century skills are considered to strengthen social capital (social capital) and intellectual capital (intellectual capital), commonly abbreviated as 4C: communication, collaboration, critical thinking, problem-solving, and creativity and innovation. Operationally, the 4Cs are described in four categories of steps, namely: First, ways of thinking, including being creative, innovating, critical, solving problems, making decisions, and learning pro-actively. Second, how to work, including communicating, collaborating, and working in teams. Third, the way of life as global citizens as well as local; and fourth, tools to develop 21st-century skills, namely information technology, digital networks, and literacy.

The details of 21st-century skills-based learning are as follows:

1. Communication

Communication is an activity of transferring information both orally and in writing. However, not everyone can communicate well. Sometimes some people can convey all the info orally but not in writing or vice versa.

Humans are social creatures who constantly interact with each other. Therefore, communication is one of the essential things in human civilization. The primary purpose of communication is to send a message through the selected media so the recipient can understand it. Effective communication occurs when something (note) the communicator notifies can be received well or equally by the communicant so that there is no misperception. For communication between humans to be effective, proper communication techniques are needed. The communication technique is used in conveying information from communicators to communicants with certain media. With this technique, it is hoped that everyone can effectively communicate with each other and use it appropriately.

Some techniques in communication:

- a. Clear speech and ideas without double meaning and complete.
- b. Speak firmly, without beating around the bush
- c. Understand who you are talking to, face your face and body, and understand the other person's thoughts.
- d. Delivering uncomplicated, sincere, and open.
- e. Convey information in the language of the recipient of the data.
- f. Delivering with the ability and level of understanding of the recipient of the information
- g. Convey information with global and new goals in detail.
- h. Give a real example; making you a direct model is better.
- i. Convey information gently, to impress, to awaken awareness, and to cause enlightening anxiety.
- j. Control noise and seek feedback to ensure your information is received. For example, by asking or asking to repeat it.

2. Collaboration

It is the ability to collaborate or work together, synergize with each other, adapt to various roles and responsibilities, work productively with others, put empathy in its place, and

respect different perspectives. Collaboration also means carrying out personal responsibility in the workplace and public relations; setting and achieving high standards and goals for self and others; understanding the confusion.

3. Critical Thinking and Problem Solving

It is the ability to understand a complex problem, connect information so that eventually, various perspectives emerge, and find a solution to a problem. Critical thinking is also defined as the ability to reason, understand and make complex choices; understand the interconnections between systems, and structure, express, analyze, and solve problems.

4. Creativity and Innovation

The ability to develop, implement, and convey new ideas to others; be open and responsive to new and different perspectives. Creativity is also defined as a person's ability to create new combinations. Creativity will significantly depend on one's creative thinking, namely the process of one's mind in creating new ideas. Creativity that can produce new (and usually economically valuable) inventions is often referred to as innovation.

Look at the table below:

Table 1 4Cs skill competency map according to P2

FRAMEWORK 21 st CENTURY SKILLS	KOMPETENSI BERPIKIR P21
<i>Creativity Thinking and innovation</i>	Peserta didik dapat menghasilkan, mengembangkan, dan mengimplementasikan ide-ide mereka secara kreatif baik secara mandiri maupun berkelompok.
<i>Critical Thinking and Problem Solving</i>	Peserta didik dapat mengidentifikasi, menganalisis, menginterpretasikan, dan mengevaluasi bukti-bukti, argumentasi, klaim dan data-data yang tersaji secara luas melalui pengakajian secara mendalam, serta merefleksikannya dalam kehidupan sehari-hari.
<i>Communication</i>	Peserta didik dapat mengkomunikasikan ide-ide dan gagasan secara efektif menggunakan media lisan, tertulis, maupun teknologi.
<i>Collaboration</i>	Peserta didik dapat bekerja sama dalam sebuah kelompok dalam memecahkan permasalahan yang ditemukan

5 Conclusion

The complexity of Indonesian education has resulted in many problems that have become extensive homework for the nation; the education crisis, moral crisis, and being left behind by other countries are things that all education stakeholders need to consider. Public empowerment as a new paradigm that must be encouraged to improve the quality of education in Indonesia requires appropriate steps, namely measures to reposition and re-actualize national education.

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