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MILLENNIALIZATION OF ISLAMIC EDUCATION BASED ON NEUROSCIENCE IN THE THIRD GENERATION UNIVERSITY IN YOGYAKARTA INDONESIA

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Abstract

To date, Islamic Education in Indonesia is framed in traditional, conventional, and colonial paradigms. Despite the twentieth century's urges to use interdisciplinary, multidisciplinary, and trans-disciplinary approaches, mono-disciplinary approach such as classic and medieval Islamic education, is still dominating. Researches in the three new methods have engaged neuroscience that results in innovative and reliable works, indicated by the achievement of Intellectual Property Rights with downstreaming potentials. The study aims to find a model for Islamic education that is based on neuroscience in the millennial era with the mentioned attainment. The research applied a qualitative model by Denzin and was located in the Magister Degree of Islamic Education of Universitas Ahmad Dahlan, Yogyakarta, in 2008. It involved six lecturers and thirty-one students. The data were collected through participatory observation, in-depth interview, and documentation. The research generates a neuroscience-based model for Islamic education in the millennial era through the development of research-based instruction. Further, the development allows the achievement of Intellectual Property

Rights and downstreaming potentials. The model is the continuation of Islamic education modernization initiated by Muhammad Abduh and is relevant to the entrepreneurship of the millennial Muslim generation of the twenty-first century.

Keywords: Islamic education, neuroscience, millennial era, innovation, Intellectual Property Rights.

A. Introduction

Islamic higher education in Indonesia has followed the world's mega trend in becoming a research university by increasing the number of departments in their master's degree program (Oey-Gardiner et al., 217AD). Universitas Ahmad Dahlan is one among many universities developing the programs, particularly Master's Degree in Islamic Education (PS MPAI- Program Studi Magister Pendidikan Agama Islam)

The Presidential Regulation Number 8 of 2012 on National Qualification Frameworks of Indonesia mentions that master's degree program, or the 8th level of education, is required to conduct a research to generate innovative and credible products (Sutrisno dan Suyadi, 2015). Therefore, PS MPAI is responding to the demand to develop similar ideas in the field of Islamic education. One of the characteristics is a novelty, which is proven through the attainment of Intellectual Property Rights and downstreaming potentials (Syafrinaldi, 2012).

Nevertheless, recent innovative research holding the Property Rights as well as downstreaming potentials are dominated by the fields of engineering and industry, (Cho, Kim, & Shin, 2015), (Woo, Jang, & Kim, 2015), (Kang & Motohashi, 2015). They have not discussed the domain of social humanities, particularly social religiosity, such as Islamic Education. Although Lemley and other researchers are against Intellectual Property Rights for the sake of intellectual freedom (Lemley, 2015), Jacob Holland with several relevant researchers encourages people to attain it, triggered by

the occurrence of violations and plagiarism in several countries, particularly in China (Holland, 2017).

Ironically, innovation in Islamic education is stagnant in the renewal or modernization (Syamsul Bahri, 2016). It has not reached the stage of the millennialization of Islamic learning. The reformation with the varied pattern is still in normative and philosophical domains, instead of theoretical, empirical, and applicable (Sa'adi, 2011); thereby it is irrelevant with the digital era of the millennial, especially in 4.0 industrial revolution. Hence, innovation in Islamic higher education, in terms of materials and methods, is inevitable (Abdullah, 2017).

The condition implies a more significant gap between teachers and students (Bauman, Marchal, Connell, & Patterson, 2014). Nowadays, teachers are from Generation X, born in the 1970s (Putra, 2016). They have to teach the "Z" generation students who were born in the 2000s. Unfortunately, these teachers use outdated theories and methods (traditional, conventional, and colonial) arranged by the classical and medieval era, the decline of Islam. In that circumstance, religion becomes an "expired medication" for "religiosity sufferers" of the millennial generation.

The results, religion has no longer served as *rahmatan lil alamin* (Misrawi, 2007). Instead, it is the source of conflict (Fajarini, 2014) for the Z generation. For example, many teachers of Islamic Education subject declared that internet, gadget, and androids are *haram* because they give more *mudharat* (bad things) rather than benefits. It conflicts the learners' interest (Febrino, 2017).

Another implication is that generation Z tries to escape from religion because they see it as irrelevant to their era. Consequently, they become a half robot who is intellectually smart but spiritually vulnerable (Muthohar, 2014). Further, this generation learns religion through online media provided in their gadget and Android (Berliani, 2018). What is ironic about learning through the press is the fact that Islam in the online world has been controlled

by radicalism (Yuliarti, 2015), (Gürbüz, 2016) fundamentalism, terrorism (Ida, 2016) puritanism, secularism, (Bauman et al., 2014) and liberalism (Sahin, 2018).

The problems are due to the mono-disciplinary approach used in learning Islamic education, a condition of the first generation university in the medieval era. Meanwhile, the third generation of higher education in the millennial age is using interdisciplinary, multidisciplinary, and trans-disciplinary approaches. The use of the old method resulted in static, dogmatic, and anti-realistic teachings.

Research in Islamic Education using interdisciplinary, multidisciplinary, and trans-disciplinary has made a connection with neuroscience, a science about the brain, which is developed rapidly in the twenty-first century (Suyadi, 2015). However, the research is less developed and stopped in academic discourse, while the ideal is its theoretical study. As a result, religion failed to take the role as a problem solver for particular cases, such as brainwashing, terrorism, and corruption. For example, a corruptor's brain is normal but it is unhealthy (Pasiak, 2012). Religion only serves to justify "sins" and the threat of the hell, as well as other sacred dogmas without offering an alternative solution to prevent or anticipate the wrongdoings.

Previous researches show that the innovation of Islamic education develops three tendencies. First are those with the tendency to create the ideas of Islamic Education, similar to the modernization of Islamic Education by Muhammad Abduh (Syamsul Bahri, 2016), (Kamilah, 2014), Intellectualism of Fazlurrahman (Aan Najib, 2015), (Fahmi, 2014) and educational concepts of Hasan Al-Banna (Huda, 2015). The researchers are found to bring novelty into the field, but it is only limited to a conceptual domain, instead of digital. Thus, it is still speculative, rather than applicative (Sa'adi, 2011).

Second are those that respond to the actual issues, such as Islamophobia, which is correlated to radicalism, fundamentalism,

and terrorism (Ratna Istriyani, 2016), challenges of Islamic education in social, political, and cultural life, as well as its contribution to the state and the nation (Saekan, 2017) (Ulfa Masamah, 2016) (Syah, 2016). The inclinations contribute to the innovation of Islamic education, but it supports only one side of it, which is socio-religiosity. The change does not only add to the social, cultural, and moral aspect but also implies the development of intellectual properties (Syafrinaldi, 2012).

The third is the research with the propensity to use an interdisciplinary approach, such as those facilitating the disabled (Wahyuningsih, 2016), and Quranic stimulation implication for children development, especially their intellectual, emotional, and spiritual intelligence (Suciati, 2015). All of the researches are creative, but they are less innovative.

Based on the reviews, few types of research are related to Islamic education constructing the development in higher education level, particularly the Master's Degree program with the achievements above. Therefore, the study aims to know the innovation of Islamic education based on neuroscience using interdisciplinary, multidisciplinary, and trans-disciplinary approaches to create innovative and credible works proven by the attainment of Intellectual Property Rights and downstreaming potentials. It is necessary to respond to this question amidst the demands of innovation in Islamic higher education (Deni Yanuar, Hamdani M. Syam, 2018) in Indonesia, in which Intellectual Property Rights is in crisis.

B. Research Method

The research was conducted in a year, which was in 2018. It belongs to field analysis using Norman K Denzin qualitative approach (Denzin, 1997). The approach was selected to find an ideal model for Islamic education in the millennial era, which is not limited to theoretical concept, but empirically tested. The research took place

in the Master's Degree Program for Islamic Education (PS MPAI) Universitas Ahmad Dahlan Yogyakarta. The study program is seen to be unique, in that the teaching is developed through research that produces innovative and credible results indicated by the attainment of Intellectual Property Rights and downstreaming potentials.

The data were collected using Cresswell model (Creswell, 2015) that included participatory observation, in-depth interview, and product documentation. The participatory observation was used because the researcher is part of the innovators in the department, thus directly involved in the teaching and learning process, research, as well as in the community service. In-depth interview was carried out to the lecturers, consisting of six lecturers having a doctoral degree, and thirty-first students of Islamic Education Master's Degree program of Universitas Ahmad Dahlan. The interview object is the field specification developed in the research holding Intellectual Property Rights and downstreaming potentials. The product documentation refers to the data collection of all the licenses obtained by the students and the lecturers in 2018.

The data were analyzed using the Cresswell model, including data display, data reduction, and interpretation. The data were displayed by exposing all the results of the interview. They were reduced through selecting, choosing, and distinguishing those that are relevant to the research questions. Documentation was carried out to examine the letters explaining the innovation as well as the works by the lecturers and students as the participants. The three were analyzed using triangulation to test validity and reliability. Next, the valid and reliable data were interpreted creatively (the meaning of creativity) to find the in-depth meaning.

C. Millennialization of Islamic Education

Reformation or modernization of Islamic Education inspired by Muhammad Abduh in XIX century is not developed in the millennial era. A research conducted by Sholeh showed that

the studies of Islamic philosophy, up to the master's degree, is limited to history and metaphysics (Soleh, 2013). Even if scientific development cannot be separated from philosophy, it does not mean that the products can only take the form of history and metaphysics. Instead, it should produce a methodology or epistemology.

Islamic Education is the practice of Islamic Philosophy (Abbas Mahjub, 1987). Stagnation or limitation to history and metaphysics will prevent Islamic Education from developing. As a result, Islam taught to the millennial is the one understood in the medieval era, thereby making it less relevant with the current challenges. Consequently, the millennial is not interested in learning from conventional teachers. Instead, they learn from online media. Unfortunately, the media is dominated by fundamentalism and radicalism (Yuliarti, 2015), (Ida, 2016).

Sy, the Head of the Magister Program of Islamic Education Universitas Ahmad Dahlan (PS MPAI-UAD) stated that:

> "Islamic education in the millennial era cannot be completed with modernization, especially "purification." Instead, millennialization is the alternative to develop the insight that is synergized with various online media and digital technology. In the academic context, the development or innovation in Islamic education should produce innovative and reliable products proven by the attainment of Intellectual Property Rights and downstreaming potentials." (Excerpt of the interview with Sy on Monday, May 14, 2018)

The statement of Sy serves as need analysis, (Assegaf, 2007), which is the needs of the millennial generation for a digital model of Islamic education that is free from radicalism. The analysis is also relevant with the schools of thought in Islamic education, such as the confrontation of radicalism against democracy, as proposed by Woodward (Woodward, 2015) or Islam in the past in America as explained by Sally Howell (Howell, 2014).

On the other hand, the statement made by Sy serves as a developmental design (Sugiyono, 2015), which is a design for

innovative and credible Islamic education. It is per Abudin Nata on Islamic education in the millennial era (Nata, 2017). Indeed, it is in line with the ideas proposed by Jenny Berglu on the trend of Islamic education in developed countries, such as Austria, Germany, Finland, and others (Berglund, 2015). In addition, Syarinaldi suggested that innovation is indicated by the attainment of Intellectual Property Rights (Syafrinaldi, 2012).

Genealogically, millennialization of Islamic education can be traced and developed from the ideas of Fazlur Rahman on Islam Intellectualism and the modernization of Islamic education proposed by Muhammad Abduh. Hence, both sustain each other, in that the need analysis on Islamic education serves to continue the concepts suggested by Rahman, Abduh, and Sy.

Millennialization in Islamic Education in Indonesia, particularly in UAD, is far much different from what is developed in other countries, including those in the Middle East. To date, Islamic education in that region is still under the prolonged dichotomy of science (religion against secularism) (Balci, 2013). A similar condition occurs in other countries in South East Asia, particularly Malaysia (Fauzi & Hamid, 2018), which has not found a way to overcome the conflicts related to religious education against secularism.

Therefore, millennialization of Islamic education cannot rely on the countries in the Middle East nor Southeast Asia. However, Indonesia is the exception. In other words, Indonesia becomes one of the hopes for the awakening of Islamic Education in the world. It is supported by the fact that Islamic education in Indonesia has integrated religion and general education within three clusters of paradigm: Islamization, scientification of Islam, and integration-interconnection (Abdullah, 2017). Science Islamization is introduced by AL-Faruqi (Al-Faruqi, 1995), but Kuntowijoyo opposed it with his scientification of Islam (Kuntowijoyo, 2004). In the next development, both were integrated by Amin Abdullah into

integration-interconnection (Riyanto, 2013). In it, Amin Abdullah introduced three paradigms of science: *irfani*, *bayani*, and *burhani* (M. Amin Abdullah, 2011). The three clusters support the mega-project of Islamic education millennialization.

Other than reformation and modernization in Indonesia and other countries, issues related to the transformation of Islamic education and Islamic education in the globalization era enlivens the dynamics of Islamic learning. Nevertheless, they still separate religion and secular education (Dacholfany, 2015).

Based on the analysis, it can be concluded that Islamic education in Indonesia is more innovative and more relevant to the millennial era compared to that in other countries. It is due to the efforts taken to integrate religion and general science into a complete and fresh configuration of science. In other words, the innovation of Islamic education in the millennial era is the "millennialization of Islamic Education." When Muhammad Abduh inspired the modernization of Islamic education in the Middle East, researchers are encouraging the "millennialization of Islamic education" in Indonesia

The term millennialization refers to the era. It has several other names, such as disruption era and 4.0 industrial revolutions. The first is preferred to be the name of the period because it sounds more innovative, while the latter (disruption and riots) are seen to be more provocative.

Associating millennialization with modernization, globalization, reformation, or other terms with the elements of novelty, the one in millennialization is closer to "digitalization," which can rarely be found in the conditions as mentioned above. For example, reformation and modernization are closely related to philosophical and theoretical thinking or general speculative concepts.

Similarly, globalization is related to the external influence on the internal condition of Islamic education. Millennialization

is not only limited to philosophy and theory, but also to digital innovation which is tested in the implementation and has global effects

Millennialization is also relevant to the strengthening of entrepreneurship of the young generations in their efforts to achieve success in life (Chotimah, 2014) and to obtain intellectual property rights. In detail, the difference between millennialization and other terms are presented in table 1. The differences are analyzed using interdisciplinary, multidisciplinary, and trans-disciplinary approaches

Table 1. Differences between reformation, modernization, globalization, and millennialization

Inter-, multi-, and trans-discipline	Reformation	Modernization	Globalization	Millennialization
Tawheed, aqidah & ritual practices	Purification	Purification	Purification	Purification
Patterns	Philosophical	Theoretical	Generalization	Scientific
Credibility	Normative	Speculative	Speculative	Implemented
Originality	Personal	Publication	HKI	Publication, HKI, , & downstreaming

The table explains the difference in terms of accentuation between millennialization and other types of innovation. Millennialization in Islamic education can be defined as follow: "Millennialization of Islamic education is the development of modernization of Islamic education in the millennial era using interdisciplinary, multidisciplinary, and trans-disciplinary approaches in the effort to produce innovative and credible works which are proven through the attainment of Intellectual Property Rights (HKI-*Hak Kekayaan Intelektual*) and downstreaming potentials."

The concept is more comprehensive compared to the idea of modernization by Muhammad Abduh and intellectualism of Islam

by Fazlurahman. Oriented to the changes of attitude and the way of thinking (Fahmi, 2014), particularly in terms of dynamic *muamalah* (Dacholfany, 2015)(Baidlawi, 2006) and despite the intellectualism of Islam which is oriented to the integration of science (Khotimah, 2014), millennialization of education narrows the focus into Islamic education. It aims at generating innovative and reliable products indicated by the attainment of Intellectual Property Rights and downstreaming potentials. The characteristics are relevant to those of the millennial generation with their enthusiasm in entrepreneurship and ambition to reach the success (Nabi, Fayolle, Lyon, Krueger, & Walmsley, 2017), (Kozlinska & Raudsaar, 2017).

D. Islamic Education and Neuroscience

The concept of millennialization of Islamic education, substantively, should develop Islamic science. It requires the use of inter-, multi, and trans-disciplinary approaches. The research conducted by Suyadi on Islamic education using the three disciplines is related to neuroscience (Suyadi, 2015). To him, while millennialization of Islamic education resulted in the characteristics above, neuroscience cannot be ignored in the learning. Tajdin stated that neuroscience is the basis of innovation for Islamic education because it is the core of critical, creative, innovative, and intuitive (Tajdin, 2004). In this case, Sy stated that:

> "Islamic Education Program, either the bachelor or master's degree, has included neuroscience into its main curriculum. In the bachelor degree, neuroscience is learned through the subjects of "Neuroscience of Islamic Education" and in the master's degree in "Neuroscience and Theory of Learning." (Excerpt of the interview with Sy, Saturday, June 9, 2018).

The statement indicated that the neuroscience-based millennialization helps lecturers and students develop innovative and reliable products. Few universities have included neuroscience in the curriculum. Among them is the medical department, which is

specifically interested in that subject (Snell, 2010). Other than Medical Faculty, Early Childhood Education Department (PG-PAUD-*Pendidikan Guru Pendidikan Anak Usia Dini*) of several universities in Indonesia have included neuroscience in their curriculum, because the brain of early children develops the most rapidly (Suyadi, 2016). Therefore, neuroscience is the fundament of the practice of early childhood education (George S. Morrison, 2012). Nevertheless, neuroscience has not been integrated into the curriculum of Islamic Education.

PS MPAI-UAD is one of several programs that include neuroscience in the curriculum. Other similar program treats it as topics for discussion in seminars and workshops because they are under the dichotomy of religion and secularism. Indeed, they conflict the understanding between the brain in neuroscience and *qolb* in the Quran. They think that Islamic education should emphasize the development of *qolb*, heart, or morals (Barni, 2017) (Imam Al-Ghazali, 2003) instead of the brain, neuroscience, and critical thinking. It is similar to that of the mono-disciplinary approach of the medieval universities when *qolb* is regulated in mind instead of in the heart (Pasiak, 2012).

The different perspectives prevent neuroscience from entering the curriculum of Islamic education. However, several academics, understanding neuroscience, have attempted to insert it in particular subjects as supplementary materials. In this case, Wi, one of the lecturers of MPAI-UAD, Yogyakarta, Indonesia, stated that:

> "Neuroscience is new in social humanity. I think including or adding it to one sub-topic of a subject, under certain subject such as theories of learning, is sufficient. Thus, after discussing the theories, such as behaviorism, cognitivism, constructivism, we can learn about neuroscience." (Excerpt of the interview with Wi, Friday, July 20, 2018)).

The statement shows that Wi uses dialogic paradigm in integrating two different science, which is by inserting one of them (Ian G. Barbour, 2002). Meanwhile, the statement of Sy

tends to use integrative paradigm (Abdullah, 2015) in which he integrates Islamic education and neuroscience into a new field: Islamic education neuroscience. Both models are not included as the Islamization of science as proposed by AL-Faruki (Al-Faruqi, 1995) and Naquib Al-Attas (Al-Attas, 1984). They are neither the paradigm introduced by Kuntowijoyo (Kuntowijoyo, 2004), but the combination of both: integration-interconnection (Riyanto, 2013).

Neuroscience is rapidly developed in the millennial era, far beyond quantum physics of the twentieth century. The development has crossed various fields of science, such as psychology (neuropsychology), pharmacy (neuropharmacy), marketing (neuromarketing), web design (neuro-web-design) (Ikrar, 2016) and education (*neuroeducation*). Indeed, Suyadi has suggested the underlying base for the integration of neuroscience and Islamic education (Suyadi, 2015).

Neuroscience is a science about brain or science of thinking, including critical and creative thinking, in the efforts to generate innovative and credible works. Up to the present time, Islamic education has not scientifically studied the science of reasoning, except *mantiq* (logic), which is still philosophical. The result, Islamic education is not sufficient to develop critical and creative thinking. Therefore, in this millennial era, it should add neuroscience as the base for critical, creative, and innovative thinking.

Normative basis for including neuroscience in Islamic education is the Quran, particularly QS 96: 15-16. Both verses contain the word "*nashiyah*" (crown) to refer to the brain or neuroscience (ITB, 2014). Etymologically, when the verses were revealed in VII M, the word "brain" was unknown. Besides, neuroscience emerged in XIX, precisely in 1961 (McCandless, 1997). Therefore, *nashiyah* in both verses are the science about the brain or neuroscience.

Brain functions to think, which is in the Quran is called *'Aql* (Shihab, 2012). The term is repeated 49 times, all of which are in the form of *fi'il mudhari'* (present tense), especially those related to

*wawu jama'ah (*plural form), such as *ta'qilun* or *ya'qilun*. The verb *ta'qilun* is repeated 24 times and *ya'qilun* 22 times (Shihab, 2012). Meanwhile, the words '*aqala*, *na'qilu*, and *ya'qilu* are repeated once, and *afala ta'qilun* is repeated 13 times (Shihab, 2012) (Shihab, 2006). Hence, neuroscience is a "scientific evolution" for the concept of '*Aql* in Islamic education. Without neuroscience, it seems to be pedagogical doctrinal, instead of rational empirical.

Further, the Quran instruction for human to think are evident in the use of the verbs such as:: "*dzikir*","*tafakkur", "nazar", "tabaṣṣur", "tadabbur", "tafaqquh", "tadhakkur", "i'tibar", "ta'aqul" dan "tawassum"* (Taufiq Pasiak, 2008). They show a different level of in-depth thinking. For example, *dzikir* (memorize) is different from *fikr* (analyzing). Therefore, using neuroscience as the basis of creative and critical thinking to create innovation is the implementation of the Quran.

In neuroscience, the process of critical thinking is regulated in the left hemisphere prefrontal cortex, while creative thinking in the right hemisphere (Taufiq Pasiak, 2008). Meanwhile, innovative thinking is the synergy of both regions, allowing the formation of a habitual pattern, or what is called intuitive brain (Pasiak, 2009).

Intuitive brain is often called an imaginative mind, for the ideas are mostly illogical, both in terms of reasons and of emotional. It is closer to "spiritual reasoning" or supra-rational (Abdul Munir Mulkhan, 2013). In Islam, this kind of thought is called *ilmu ladzuni* (Abdul Munir Mulkhan, 2004). It is understood as a gift from God or without the need to follow a particular learning process (Fuadi, 2013). In fact, in the perspective of neuroscience, it is, basically, the venture of the intuitive brain.

Innovation, particularly the original one, is a result of intuitive brain or imagination, as explained in neuroscience. It is correlated with the research results of the lecturers and students of PS MPAI that obtain Intellectual Property Rights and downstreaming potentials, as much as 25 awards shown in table 3.

From the analysis, we conclude that millennialization of Islamic education which is based on neuroscience is the development of creative thinking originated from the concept of '*aql* in the Quran in the millennial era to produce innovative and reliable innovation. Through neuroscience, the millennial can develop their logic, thereby creating change that combines logic and spirituality.

The concept of millennialization of Islamic education based on neuroscience is sufficient compared to the technical efforts to apply neuroscience in the subject (Suyadi, 2015). Besides, professional efforts do not have a clear theoretical background. Instead, it is limited to practical learning methods that the change is not made to the whole part, such as *quantum learning* (Bobbi DePorter & Mike Hernacki, 2000) *barin based learning,*(Jensen, 2000) *accelerated learning* (Adi W. Gunawan, 2003) and other kinds of methods labeled with "learning."

E. Islamic Education and Intellectual Property Rights in the Third Generation Higher Education

J.G. Wissema, a professor in innovation and entrepreneurship in the Delft University of Technology, proposed a new term: the third generation university (*3GU: Third Generation University*) (Wissema, 2009:148-162). This university is the continuation of the first generation higher education (college) that can only carry out the teaching and learning process. It can develop into the second generation (institute) that conducts teaching and research. Next, the second-generation university can be established into the third generation (university) that treats teaching and research as the instrument of incubator for research-based commercial activities to encourage the economic growth of a country. Further, Gardiner explains the difference among the three generations in terms of institution, knowledge, approach, graduates, objectives, and orientation, as shown in table 2 (Oey-Gardiner et al., 217AD).

Table 2. Differences of First, Second, Third Generation

Pattern	First Generation University	Second Generation University	Third Generation University
Institution	College	Institute	University
Science	Normative	Historical/theoretical	Rational/scientific
Approach	Scholastic	Mono-disciplinary	Inter-, multi-, and trans-disciplinary
Graduates	Teaching and education	Education and research	Education, research, Intellectual Property Rights, and downstreaming
Objectives	Professional	Experts/professional plus scientist	Professional, scientist, entrepreneur
Roles	Maintaining the values	Developing values	Creating values
Orientation	Local/National	Regional/ Global	Global/ millennial

The table summarizes the difference among the first, second, and third generation in terms of institution, science characteristics, research approach, graduates, objectives, roles, and orientation. One outstanding aspect of the third generation university is the downstreaming of research or research-based commercialization, which is manifested in entrepreneurship education. Despite the less significant impact of entrepreneurship to the development of economics and business (Nabi et al., 2017), it gives much better result in higher education (Plummer, Klotz, & Rhoads, 2014), particularly in the emergence of new business (Cloodt, 2014). After all, entrepreneurship is dominated by the faculty of economy and business, while the research findings of faculty of science and technology have not been included (Maresch, Harms, Kailer, & Wimmer-wurm, 2016).

Based on the mapping, the third generation university is the most relevant to the millennial era, since the emphasis is establishing research as the instrument for entrepreneurship. Therefore, the research of this university focuses on the attainment of Intellectual Property Rights and downstreaming potentials. Indeed, they have become new (David B. Audretsch, Isabel Grilo,

2007) (Albert N. Link, Donald S. Siegel, 2015). The success of the program will ensure a bright generation for the future.

The development of science, including Islamic education that results in a commercial product, should be protected from plagiarism or piracy. Syafrinaldi takes note on the importance of legal protection for researchers with their innovation, either in the form of property rights or patent. He stated that the attainment of Intellectual Property Rights, particularly in copyright, is proportional to the advance of science and technology as well as the economy of a particular nation (Syafrinaldi, 2012). The fewer the patent of a country, the poorer and more underdeveloped it is. Therefore, intellectual property rights and downstreaming potentials define the advance of Islamic education of a nation.

The Master's Degree Program for Islamic education Universitas Ahmad Dahlan has developed the subject through research. Besides, it has been awarded Intellectual Property Rights during 2018, which is for 25 innovations, as shown in table 3.

Table 3. The attainment of Intellectual Property Rights (HKI) PS MPAI-UAD 2018

No	Types of innovation	Name of innovation	Regis-tration Number
1	Computer Program	Innovation for Interactive Mobile Learning Media based on Android for *Aqidah* and *Akhlak* subjects	000112697
2	Video games	Interactive learning media for *Akhlak*	000112592
3	Visual Aids	Tajwidukatif, Visual innovation for learning for in Islamic Education for grade VIII SMP	000112579
4	Visual Aids	Panama (papan asmaul husna-board for attributes of Allah)	000113530
5	Visual Aids	Magnet akhlaq terpuji (Magnet of the good deed)	000112578
6	Visual Aids	Qunanta edu (Al-Qur'an, Injil, Taurat, Zabur Education) for Islamic education subject for Grade VIII of SMP	000113532

7	Textbook	Learning Arabic alphabetic for kids for elementary students grade 1, 2, and 3	000113520
8	Guidebook	Android-based Application *Amal Yaumi* (daily practice)	000113528
9	Guidebook	Guidelines for visual aids of *Fiqh Koper* MIHATTU' (Miniatur Ibadah Haji Tamat-tu'-Hajj miniature)	000113202
10	Guidebook	Adobe flash-based learning media for teaching akhlaq to elementary school students	000114011
11	Guidebook	Innovation for memorizing the Quran Animasi tahfidzul Qur'an metode kaisa (Animasi Taquka)	000113531
12	Computer Program	Android application Husnul Khatimah	000112921
13	Guidebook	Guidelines of Tadribu Durusi Ushulil Fiqhi (TADUF)	000113523
14	Guidebook	Web-based information system design to assess the students	000129596
15	Guidebook	Tahfidzul Qur'an Learning media based on interactive CD	000129809
16	Guidebook	Technical guidelines for *Qurban*	000129945
17	Guidebook	Adobe flash-based media to improve students' participation in aqidah and akhlaq.	000130193
18	Guidebook	Android-based traditional games	000130597
19	Guidebook	Interactive learning media for fiqh and thaharah (ablution)	000129938
20	Guidebook	The monopoly of Pillars of faith (*rukun iman*)	000130598
21	Computer Program	Android-based Learning media for mufrodat and qawaid of Arabic for SMP Muhammadiyah	000130501
22	Guidebook	Guidelines for Android-based Arabic learning materials for language laboratory	000130795
23	Guidebook	virtual reality media for the simulation of hajj (for SMA/SMK Muhammadiyah and the equal)	000130607
24	Computer program	Learning method for memorizing asmaul Husna (Allah's attributes)through Indonesian children song	000130879
25	Guidebook	Interactive learning media for fard prayer procedures based on Macromedia Flash 8.0	000130599

Table 3 indicates that the development of Islamic education in PS MPAI UAD is diverse, ranging from books, computer program, or videos. It shows that PS MPAI UAD has applied interdisciplinary, multi-disciplinary, and trans-disciplinary approaches (Oey-Gardiner et al., 217AD). So far, only a few types of research at the postgraduate level produce Intellectual Property Rights, leading to the low rank of HKI ownership in Indonesia, which are 33 of 38 countries. It consists of 124.223 patents, 1.059.512 brands, 63.103 industrial designs, and 88.569 copyrights (Darmalaksana, 2017).

Timothy suggests that the innovation of Islamic education cannot rely on Middle Eastern countries. They are rich in terms of sociocultural, ethnic, language, religion, economy, and political structure, yet they are deficient in terms of patent and publication (James C. Ryan, 2018). A similar condition occurs in United Arab Emirates (UAE) that has not accommodated the interests of the millennial generation to take entrepreneurship (Hameed, Khan, Shahab, Hameed, & Qadeer, 2016) or innovation-oriented towards Intellectual Property Rights.

Intellectual Property Rights in the millennial era is the weapon to encourage the growth of the economy of a nation because it is different from natural wealth. Intellectual property gives more benefits when it is developed, while natural wealth will decrease, particularly when it is exploited or exported. Indeed, the natural wealth of a country cannot be a source of pride because it does not guarantee the well-being of society.

The export data of the natural resources of the developed countries to one another shows a decreasing score, from 70% in 1990 to 20% in 2000. The condition indicates that natural wealth does not bring prosperity to the people. Meanwhile, intellectual property has proven to do otherwise.

Hence, Intellectual Property Rights should be protected to prevent it from harming not only the owner but also the society and the entire country. It is ironic that when Indonesia gets the

opportunity to millennialize Islamic education, it is included in the watchlist country, or states that pirate the rights of other countries. For example, in terms of using a computer program, Indonesia ranked the fourth highest hijacker, reaching 86%. To date, intellectual property rights in Indonesia are only 7.68%.

Based on the analysis, it can be concluded that PS MPAI UAD has become an essential part of the third generation universities since it has developed Islamic education through research that can produce innovative and reliable works indicated by the achievement of HKI and downstreaming potentials, or having commercial values. It proves that PS MPAI UAD has been directed to the millennialization of Islamic education using neuroscience as the base of creative thinking to produce innovative and reliable works, indicated by the attainment of HKI and downstreaming potentials.

The contribution of PS MPAI UAD in developing Islamic education through research has opened significant opportunities to improve the subject at the global level, which is centered in Indonesia. The development is no longer relied on that in the Middle East, for its weak potentials of intellectual property rights. Malaysia gets a similar opportunity, where the effort to integrate religion and science (Andiyasari & Pitaloka, 2010) is developed through the establishment *Bladen learning* system(Agus Purnomo, Nurul Ratnawati, 2016). However, Indonesia is still the potential country to initiate it.

F. Conclusion

Millennialization of Islamic education in PS MPAI UAD in Indonesia in the twentieth century is the follow up of the modernization of Islamic education in the Middle East in the IX century initiated by Muhammad Abduh. Millennialization applied inter-, multi-, and trans-disciplinary approaches based on neuroscience to produce innovative and reliable works indicated by the achievement of intellectual property rights and down-streaming potentials.

Millennialization of Islamic Education is in accordance with the characteristics of the Z generation, which emphasizes on successful life through entrepreneurship. Through millennialization of Islamic education, generation Z finds Islam in its color. Instead of the old Islamic era or "misleading" online sources of Islam, the one found by the Z generation is enlightening and supporting their life. Nevertheless, the research is limited in terms of in-depth philosophical and theoretical exploration. The basic concept of Islamic thoughts is less accommodated in innovative and reliable work. Therefore, the researchers recommend further research to be related to groundbreaking research in Islamic education to provide the fundamental philosophical and theoretical concepts. This kind of research is significant to add the sacredness of Islamic education in life, instead of profane economic advance.

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