Type developing an Islamic education curriculum on outcomes-based education as a defensive strategy facing the challenges of industry revolution 4.0

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ABSTRACT

The Revolution of Industry 4.0 threatens the existence of the science of Islamic education if the curriculum is not outcomes based. The development of Islamic higher education curriculum allows the creation of new academic subjects which integrates learning, research and service to produce innovative and tested work. The aim of this research is to put forward a curriculum development model or prototype as a strategy to maintain the science of Islamic education learning programs in the era of Industry Revolution 4.0. The research approach is qualitative of the phenomenological type. The setting of the research is the learning program for the Masters in Islamic Education (*Magister Pendidikan Agama Islam* – MPAI), Faculty of Islam, Ahmad Dahlan University. The choice of this research setting is because the curriculum of this learning program has created new academic subjects which have an outcome-based integrated learning, research and service, as a result on reaching the three year point it has gained full accreditation from the Higher Education National Accreditation Board (*Badan Akreditasi Nasional–Perguruan Tinggi* – BAN-PT). Respondents in the research are the MPAI academic community which comprise six lecturers including the Chair of the Study Program and Secretariat of the Study Program together with eighty students studying at the masters level. The research results show that the MPAI learning program has created two new academic subjects that is, Islamic Education Studies and Intellectual Property Rights (*Hak Kekayaan Intelektual* – HKI) together with Neuroscience and Islamic Education Theory. Both new subjects have mobilized research which has produced innovative works obtaining more than sixty intellectual property rights and occupying the first rank in publications in national and international journals in the the Sinta Index 2020 data base. This shows that this learning program is able to maintain a scientific existence in the era of the industry revolution through outcome-based curriculum development.

1. Introduction

The theory of social change pioneered by Spencer, Durkheim and Tonnies have now entered a new era in the Industry Revolution 4.0 era [1]. The changes have had a wide impact on all aspects of life including education, such as the liberalization of education and outcome-based education in particular, the higher education ladder moreso, Islamic Higher Education (*Pendidikan Tinggi Keagamaan Islam* – PTKI) [2]. There are many existing learning programs which are not attracting interest and even being forced to close. On the other hand, at this time new learning programs have suddenly attracted community attention and supplanted existing learning programs. President Joko Widodo had

requested Tertiary Institutions (*Perguruan Tinggi* – PT) to unhesitatingly close faculties and learning programs which are time-expired and replace them with new faculties and learning programs. The Minister for Research, Technology, and Higher Education felt challenged by President Joko Widodo as a result in 2018, 120 new learning programs had been prepared [3]. The era of disruption demanded PTKI revitalize and reform existing learning programs which were no longer relevant and open new learning programs appropriate to the challenges of the age. However, these efforts were not easily conducted because the administrative requirements of opening a new learning program are very difficult to meet. Apart from that, politically several existing learning programs especially the Islamic Education Study Program indeed had to keep on existing throughout the period because of the directions of Government Regulation No. 55 of 2007 On Religious Education and Religious Matters (*Peraturan Pemerintah No. 55 Tahun 2007 Tentang Pendidikan Agama dan Keagamaan*) [4]. Because of that, theoretically a strategic step for the development of scientific matters is not to eliminate existing faculties and learning programs, but rather to develop its Higher Education Curriculum (*Kurikulum Pendidikan Tinggi* – KPT) [4]. The development of a KPT enables the creation of new academic subjects which are in accord with Industry Revolution 4.0 and discontinues existing academic subjects which are no longer relevant. In this way a strategic and realistic step for PTKI is not to close the existing learning programs and open new learning programs, but to develop existing academic subjects to become new academic subjects which are appropriate to the demands of the industry revolution.

The publication of Presidential Regulation (*Peraturan Presiden* – Perpres) No. 08 of 2012 Indonesian Qualification Framework (IQF) can be the best lever to develop the KPT, because in the IQF itself it requires all Study Programs to redesign or develop, implement, and evaluate curriculum. The development of KPT references the IQF, and it can be expected would create new academic subjects consequently removing existing academic subjects. The developing of KPT referencing the IQF opens the opportunity to integrate outcome-based learning, research and service in particular, publications and Intellectual Property Rights. New academic subjects which have integrated all three and are outcome-based have the potential to become the new scientific core in each learning program, including established learning programs. New academic subjects, as the scientific core of learning programs, are characterized by having a greater semester credit unit (*satuan kredit semester* – sks*)* weighting than other academic subjects with an assessed learning outcome. In this way, one of the existing learning program strategies in this era of disruption or industry revolution 4.0 is the development of KPT by creating a new academic subject which integrates outcome-based learning, research, and service in particular publications and HKI. In this regard, the Faculty of Islam, Ahmad Dahlan University (UAD) has commenced a new MPAI academic subject and developed the KPT referencing the IQF and the Higher Education National Standard (*Standar Nasional Penddikan Tinggi* – SN-Dikti) [5]. The KPT in the MPAI Study Program has two new academic subjects which integrates outcome-based learning, research and service, in particular publications and HKI) [6]. Since its commencement from July 2017 until December 2020, the Study Program has gained more than sixty HKIs and produced hundreds of publications both from accredited national journals and international journals of good standing. In fact, in December 2020, the learning program in its first submission for accreditation immediately gained a level 'A' (full accreditation) from the Indonesian National Accredition Board for Higher Education (BAN-PT) based on decree (*Surat Keputusan* – SK) No. 7854/SK/BAN-PT/Akred/M/XII/2020. Because of that, the MPAI Study Program strategic step in developing a KPT referencing the IQF is of research interest because it can become a prototype or role model for the development of similar types of Study Programs in PTKI circles throughout Indonesia as a survival strategy in the industry revolution 4.0 era.

A literature review of previous research was unable to find a KPT development model referencing the IQF as a strategy to maintain the science of established Study Programs, MPAI in the era of disruption and Industry Revolution 4.0. Existing research is still in the form of searching and adjustment to the Industry Revolution 4.0. Several previous research papers, which can be mentioned here, are Alhamuddin's research into KPT referencing the IQF focusing on increasing the quality of human resources in the city of Bengkulu [7]. Abdurahman's research investigates the reconstruction of the Competency Based Curriculum (*Kurikulum Berbasis Kompetensi* – KBK)–Indonesian Quality Framework (IQF) at the level of the *Madrasah Diniyah* (Non-mainstream Islamic Schools) [7]. Solikah's research identifies a Learning Outcomes curriculum [8]. Wahab undertakes research which is focused on the Arabic language curriculum at State Islamic Higher Education Institutions

(*Perguruan Tinggi Keagamaan Islam Negeri* – PTKIN) based on the IQF [9]. Jono undertook research focussed on the implementation of the IQF in the context of the English language Study Program throughout the city of Bengkulu. R. Masykur and colleagues did research with a focus on the facilities and infrastructure (*sarana prasarana*) for the implementation of IQF [10] and, Susilo undertook research focused on IQF implementation in the English language Study Program [11]. This body of research is still in the form of efforts to apply the IQF which encountered many obstacles, but not yet getting to the development of the KPT as a strategy to ensure the existence of science in established Study Programs in the era of disruption.

Based on this literature search, it can be concluded that no research was found on the development of KPT referencing the IQF, which is oriented to the creation of new academic subjects as the scientific core in established learning programs as a strategy to maintain the scientific existence of learning programs in the industry revolution 4.0. Specifically, this research is unique in three regards. Firstly, this research is done at the master's degree level. Secondly, this research is focused on the creation of new academic subjects as the scientific core of established learning programs. Thirdly, the new academic subjects which have been created are oriented to integrating outcome-based learning, research, and service in particular, publications and HKI. All three focusses are a strategy for existing learning programs in maintaining a scientific existence in the industry revolution 4.0 era. The aim of the research is to make an explorative analysis of the model or pattern of KPT development referencing the IQF and SN-Dikti in the Ahmad Dahlan University MPAI Study Program as a strategy to maintain the scientific existence of Islamic education in the era of disruption. The aim of the research is formulated in two focus areas. Firstly, a formulation of MPAI learning program specific learning outcomes as a mechanism for the creation of new academic subjects. Secondly, the integration of learning, research, and service based on publications and HKI on newly established academic subjects. The further exploration of both these focus areas is very important because it can inspire established learning programs in Indonesian PTKI circles to maintain the scientific existence of Islamic education in the disruption era.

2. Method

2.1. Research Approach

The research approach is a phenomenological qualitative approach [11]. A qualitative approach was chosen because of wanting to go deeply into the spirit of innovation sourced from the Al-Koran and Sunnah on innovations which have been done. Apart from this, phenomenology was chosen because the aim of the research was to extend to the significance of curriculum development in the sphere of affections and religion as a result, a deeper qualitative analysis is needed [12].

2.2. Research setting

The research setting is the MPAI, Ahmad Dahlan University. The research setting has been chosen because the learning program is the only learning program in Indonesia which is just two and a half years old and immediately obtained full accreditation from the National Accreditation Board. One of the important factors which has determined this outcome is the developing of an outcome-based curriculum in particular intellectual property rights and scientific publications.

2.3. Research respondents

The research respondents are the MPAI academic community comprising six lectures and eighty MPAI students [13]. These respondents were chosen because they had become innovators in the field of Islamic education evidenced by the ownership of intellectual property rights. Rinaldi states that intellectual property rights are a special right given by the state to creators, innovators, inventors, for their creations or discoveries which have direct financial value both automatically and through registration mechanisms whose regulations have been determined. All the research respondents both lecturers and students possess intellectual property rights, as a result their creations and innovations are not in any doubt.

2.4. Instrument

The technical instrument of data collection in this research are participant observation, in-depth interviews, and publication and the HKI acquisition documentation. The in-depth interviews with the Chair of the Study Program (*Kaprodi*) were focused on the design of an outcome-based curriculum

innovation including the creation of new academic subjects in particular, Islamic education neuroscience. Further, interviews with lecturers were focused on curriculum implementation work in learning practices to encourage student publications and innovation, integrating learning, research, and service. As for interviews with the students, it focused on outcomes, the publication and compilation of innovative work to obtain intellectual property rights. The documentation focused on the document archives of lecturer and student publications and the obtaining of HKI over the last three years.

2.5. Validity and reliability

The validity and reliability of the data was ascertained by means of expert judgment of the validity of the publication document and the intellectual property rights. The validation of the curriculum innovation documents was done by authenticating the authorization page, that the curriculum innovation document had been officially authorised by the institution. Further, the validation of the publication data had been electronically searched through the *Sinta Ristekdikti* (Higher Education Science and Technology data base index). The publication documents were deemed valid if it contained the name of the respondent and the affiliation or institution in accordance with the research setting, that is the Islamic Education Masters Program. As for the validation of the intellectual property rights, it was done by affirming the intellectual property number, the inventor's name, and affiliation.

2.6. Data analysis technique

The data analysis technique was done by means of display, reduction and interpretation to the meaning of creativity [14]. The interview data was analyzed by means of triangulation, clarified, and categorized in accordance with the aim of the research. The publication data and intellectual property rights have been analyzed and its accordance with the curriculum and learning practice. The whole of the analysis is interpreted critically and affectively as a result a meaning has been derived creatively.

3. Results and Discussion

The research results are presented in two main findings. First, the model of creating of new academic subjects as a strategy of maintaining the scientific existence of Islamic education in facing the industry revolution. The creation of new academic subjects is a realization of the developing of higher education curriculum, referencing IQF and SN-Dikti, with its outcome-based education (OBE). Second, the integration of learning, research, and service in new academic subjects. The integration of learning, research and service in each academic subject is an indication that studies in these academic subjects are dynamic and productive, and able to respond to developments of the age (see Figure 1).

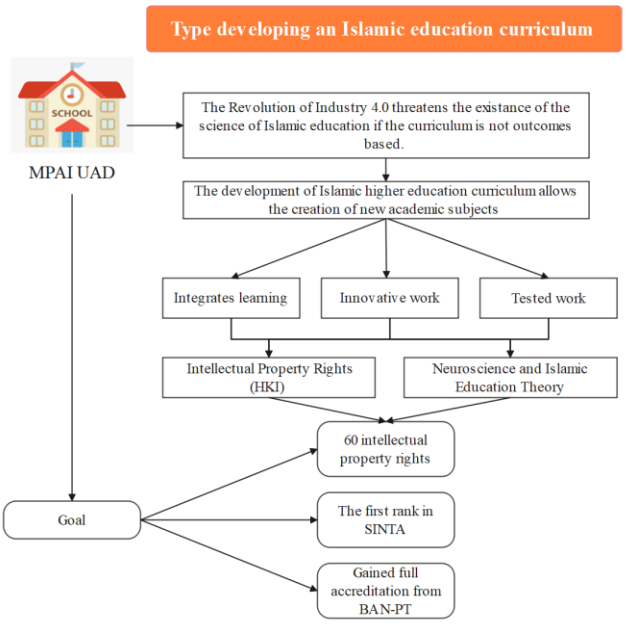

Fig. 1. Type developing an Islamic education curriculum

3.1 A Development Model for New Academic Subjects

The curriculum which integrates learning, research and service to the community is an outcome-based curriculum better known by the term Outcomes Based Education (OBE) [15]. A curriculum which references OBE is able to endure and exist in this industry revolution era. Because of that, the development of a KPT referencing the IQF and SN-Dikti should be oriented to the creating of new academic subjects and integrating learning, research and service as a result its outcomes are achieved (publication and HKI). In the guidance book for the compilation of Higher Education curriculum it is stated that step of creating an academic subject is to formulate a description of specific learning outcomes (*capaian pembelajaran* – CP) referencing the IQF and SN-Dikti (generic description), then making a matrix which connects specific CP by adding learning material taken from the relevant learning program area of integrated Islamic and science knowledge. The following analysis and discussion set out the MPAI-UAD learning program steps in formulating specific CP and forming new academic subjects – in particular Islamic Religious Education Innovation and Intellectual Property Rights together with KPT – at the same time giving a calculation of the sks weighting. In accordance with the Minister of Research, Technology and Higher Education Regulation No. 55 on Higher Education National Standards (*Permenristek Dikti No. 55 Tahun 2015 Tentang Standar Nasional Pendidikan Tinggi* – SN-DIKTI), that the formulation of specific Learning outcomes (CP) must reference the IQF and SN-Dikti. How can the MPAI Study Program do this? The Head of the MPAI Study Program responded as follows:

> "The formulation of MPAI Study Program specific learning outcomes references the IQF and SN-Dikti done in parallel and horizontally, that is a substantive message in the IQF and SN-Dikti generic description is added with Study Material (the relevant knowledge area) and is given a measurement for the depth of learning / lectures based on Bloom's taxonomy."

The CP formula is operational and detailed as well as flexible and contextualized from the explanation in the book Higher Education Curriculum Development (KPT) compiled by the Ministry of Research, Technology and Higher Education (*Kementerian Riset, Technology dan Pendidikan Tinggi* – Kemenristek Dikti), and the Director General of Islamic Education. In the KPT compiled by Kemenristek Dikti, the phase of compiling the learning outcomes [16] is still general and has yet to include an operational formula as a formulation of Bloom's taxonomy. In fact, the KPT compiled by the Director General of Islamic Education immediately gives an example of the learning outcome of each Study Program [17] as a consequence lacks flexibility for adaptation by related learning programs in the various regions. From a technical perspective, the following is an extract of the pattern of academic subject creation which begins from the formulation of learning outcomes in the MPAI-UAD as shown in Table 1.

Table 1. Extracts from MPAI-UAD Study Program Specific CP

IQF (Level 8 point 2)	SN-Dikti (Masters Program point b)	Specific/Special CP MPAI-UAD Study Programs	Academic Subject
Able to develop knowledge, technology, and/or art in a scientific field or professional practices through research, to produce innovative and tested work.	Able to undertake academic validation or studies in accordance with the field of expertise in solving a problem in the community or relevant industry through the development of knowledge and expertise.	Able to develop Islamic pedagogy through research of studies or academic validation to produce innovative and tested work to solve problems in schools or the community.	Islamic Education Studies and Intellectual Property Rights.
Able to solve scientific, technological and/or art problems in the field of knowledge through and inter or multidisciplinary approach.	Able to develop logical, critical, systematic and creative thinking through scientific research, creation of design or art works in a field of science and…together with a paper which has been published in an accredited academic journal or accepted in an international journal.	Able to develop logical, critical, systematic, and creative thinking through scientific research in the field of Islamic studies theories based on neuroscience with an interdisciplinary, multidisciplinary, and transdisciplinary approach.	Neuroscience and Islamic Pedagogical Theories

In the fourth column (the specific description of the MPAI-UAD Study Program), are found key words in bold as an indication of the process of creating an academic subject. If one of the MPAI-UAD learning program CP points (point a) is analyzed with formula 1, in parallel and horizontal, then it can be explained this way: the words, "able to develop" shows a level of depth of 'C4' in Bloom's taxonomy [18], or another taxonomy such as Marzona and Anderson [19]. "Islamic pedagogy" is Study Material which is studied to achieve competency. As for the words, "academic validation or learning to solve a problem", it is taken from SN-Dikti, and the words "through research to produce innovative and tested work" is taken from the IQF. In column five, the name of the academic subjects are given that is, Islamic Education Studies and Intellectual Property Rights together with Neuroscience and Islamic Education Studies Innovation. It is not a special procedure for creating a new academic subject, except for referencing the IQF and SN-Dikti. In this way, the forming of a new academic subject in the MPAI-UAD Study Program has very strong references in the IQF and SN-Dikti. On this matter, the Head of the MPAI-UAD Study Program states:

> "The MPAI-UAD Study Program has two unique academic subjects which reference the IQF and SN-Dikti that is, neuroscience and learning theory together with Islamic Studies and Intellectual Property Rights. Both academic subjects mobilize lecturer and student research as a result become a strength and uniqueness of the Study Program." (Head of MPAI-UAD Study Program).

The MPAI-UAD Head of Study Program's statement shows that there is a consistency found between the description of learning outcomes in the MPAI curriculum document with the Study Program policy to create two new academic subjects, that is neuroscience and learning theory as well as Islamic Studies Innovation and Intellectual Property Rights. Basically, the academic subjects are a repository of a grouping of learning material. On this matter, Romiszowski explains in detail an analytical map for formulating an academic subject (*Mata Kuliah* – MK) together with its learning [20]. The creation of a new MK is based on changes and developments in socio-cultural realities and the development of science [21]. Each learning program can create MK, which are different, because the academic subject differences do not significantly influence the essence of the science [22]. A number of research findings show that Study Programs of the same type in a number of countries (Indonesia, Singapure and Malaysia) have different academic subjects but the substance of the science is almost the same [23]. New Study Programs certainly use the momentum of curriculum development meet the new era such as, Industry Revolution 4.0 –5.0, and current disruptions [24]. Existing academic subjects, which are supposed as lacking relevancy, must be re-evaluated and developed so as to be in harmony with the most recent scientific developments, as occurred in the English Language Study Program which changed the academic subject 'Speaking' to 'English Phonology' [25]. On this basis, fears over the loss of existing academic subjects are not a matter for concern because the MK are only the external packaging of the learning material (*Bahan Kajian* – BK). In other words, the existing MK are packaged in a new wrapping, such as a closeness to Allah (*tasawuf*) which remains present in discussions of modern educational philosophy [26] or spirituality, combined with positive psychology.

3.2 The Existence of Islamic Pedagogy in the Industry Revolution Era

The existence of Islamic pedagogy is the industry revolution era is characterized by renewable innovation and publications. The two academic subjects which have been created by MPAI-UAD are mobilizing innovative research of the lecturers and students whose learning programs exist in this Industry Revolution 4.0 era. The academic subject Islamic Religious Education Innovation and HKI integrates oucome-based learning, research and service that is, obtaining HKI whose status is approved. Whereas the subject 'Neuroscience and Learning Theories' integrates outcome-based learning, research and service in the form of publications in accredited national journals or indexed in Sinta 1-6. The following findings analyze both these new subjects together with their outcomes.

1) Islamic Learning Innovations and Intellectual Property Rights

Legally, the MPAI-UAD Study Program Curriculum must reference the IQF level 8 which in one of its points states that students, "Are able to develop knowledge, technology, and/or art in a field of science (Islamic education) or professional practice through research, to produce an innovative and tested work." According to the Chair of the MPAI Study Program (*Ketua Program Studi* – Kaprodi), the key words in the IQF level 8 generic description are "innovation and tested". Because of that, by referencing this IQF level 8 generic description, the MPAI Study Program can create a new academic

subject, that is Islamic Learning Innovation and Intellectual Property Rights." The MPAI Kaprodi elaborates on this as follows:

> "The academic subject 'Islamic Religious Education Learning Innovation and Intellectual Property Rights' is an implementation and concurrently a development of the MPAI curriculum referencing the IQF and SN-Dikti. Innovation is certain, but what is tested must be measured! The measuring device of innovation is not just the validation of experts as in the research methodology but rather uses valid instruments, one of them is Intellectual Property Rights. The research of MPAI lecturers and students can be said to be innovative and tested if – and one of them is – to obtain a HKI and with the potential for downstream development." (MPAI-UAD Kaprodi).

This statement by the MPAI Kaprodi was regarded critically by another MPAI lecturer that is, La who said that:

> "Tested, doesn't it mean not having to obtain an HKI. Because, for the lecturer there is no certainty of getting an HKI. Moreover, for students, I worry if their subjects are too onerous for them, primarily from the perspective of cost? If students are able to, certaintly it is very good." (La, lecturer MPAI-UAD).

The statements by Kaprodi and La, an MPAI lecturer, which contradict one another, are interesting if analyzed in light of the latest literature on HKI. It seems He is greatly influenced by Syafrinaldi who states that the advancement of a nation's science directly corresponds to how many HKI it has obtained [27]. In fact, the HKI in the future will become an intellectual resource whose value is higher than its natural resources. Developing nations which rely on natural resource exports will certainly continue to decline because resources will become more and more depleted. As a consequence, resource rich countries are not necessarily able to guarantee the prosperity of its people. On the other hand, intellectual property will continue to develop and will not be exhausted. Advanced countries which are poor in natural resources but rich in intellectual resources have demonstrated they are able to create prosperity for its people.

The ideas of the MPAI Kaprodi is very realistic amid surging plagiarism and HKI piracy in Indonesia. It needs to pointed out, that Indonesia's ranking is at 33 from 38 countries in Southeast Asia in obtaining HKI [28]. In fact, from a global perspective Indonesia is fourth in terms of pirating other nation's HKI. Because of that, it is very relevant if the research of lecturers and students at Islamic Higher Education Institutions at the master's level are required to obtain an HKI. Moreover, MPAI Kaprodi possesses an idealism that the MPAI research of students and lecturers not only get a HKI, but also have the potential for downstream development, as a result impacts significantly not only on intellectual development but also financial, social and spiritual development. On the other hand, La it seems is more influenced by Lemley who states that a strict upholding of the law on the use of HKI will to the contrary limit and narrow intellectual freedom of movement [29]. The step of increasing the acquisition of HKI is seen as a backward step for a rational state. La's criticism also preserves a tradition of humaniora social research, including Islamic education which is just philosophical and contemplative analysis [30]. Consequently, the higher the level of someone's education will not directly correspond with an ever-increasing level of prosperity of the person. Higher education will only become an ivory tower which is clever at theorizing but weak in offering solutions. If the research of lecturers and students at the master's level (level 8) fails to create an innovation and does not get a HKI, then it is in keeping with the depleting of Indonesia's natural resources, with ever greater impoverishment and backwardness and also Islamic intellecturalism in Indonesia as put forward by Fazlur Rahman in the 19th century [31]–[33]. Because of that, through these academic subjects the students, with the supporting lecturers teaching the subject, are encouraged to do innovative work then submit it to the Ministry of Human Rights and Law to obtain Intellectual Property Rights. La, a teaching lecturer of this subject explains:

> "The proses of formulating lectures in this subject is not merely theoretical, but rather more towards small scale research. In the middle of the semester, we give the students material on innovation in Islamic education but after a half semester, we support them in doing innovative work and submitting it to the Ministry of Law and Human Rights to obtain an HKI. So, the end of semester exam in this subject is none other than the HKI! Because of that, it's no surprise, at an age of just three years our study program has over sixty HKI." (La, MPAI-UAD Lecturer).

Although Kaprodi's tenure has been short, just three years, he has successfully pioneered lecturer and student innovative research to obtain sixty HKI with the potential for downstream development. This outcome at the same time answers La's earlier doubts. Table 2 is a list of HKIs obtained by MPAI lecturers and students.

Table 2. MPAI-UAD Study Program Acquisition of Intellectual Property Rights

Student and lecturer	Type of creation	Innovative work creation title	Number and Date Innovative Work Request (KI)	KI number granted
RR. SRI MARFU'ATUN	Book	Interactive Faith Learning Media	EC00201821965, 24 July 2018	000112592
Jaka Prayitna, Suyadi	Computer Program	Android-based Innovation of Interactive Mobile Learning Media for Lessons on *Akidah Akhlak* (Faith and Moral Behaviour)	EC00201822059, 25 July 2018	000112697
Atik Malihah Masnun, Suyadi	Reference Book	Android-based Application for Monitoring of Devotional Deeds	EC00201823023, 6 August 2018	000113528
Dwi Yulianti, Suyadi	Reference Book	Reference Book of Teaching Aids for the Study of *Fikih Koper* (Islamic Jurisprudence), MIHATTU' (The devotions in miniature of Haji Tamattu')	EC00201822686, 1 Agustus 2018	000113202
Iing Hildah, Suyadi, Wantini	Reference Book	Adobe Flash Based Learning Media of Praiseworthy Deeds in Primary Schools	EC00201823518, 10 August 2018	000114011
Khazinatul Husna, Suyadi, Hendro Widodo	Reference Book	Learning innovation of *Tahfidzul Qur'an* (Memorization of Al-Koran), Animation of *Kaisa* Method *Tahfidzul Qur'an* (Method for memorizing the Al-Koran) (*Taquka* Animation)	EC00201823025, 6 Agustus 2018	000113531
Muhammad Marjuki, Suyadi	Program Komputer	Android Application of *Husnul Khatimah* (Faith in Facing Death)	EC00201822386, 30 July 2018	000112921
Rohadi Agus Salim, Suyadi, Ddjamaluddin Perawironegoro	Reference Book	Guidance on *Tadribu Durusi Ushulil Fiqhi* (TADUF)	EC00201823026, 6 August 2018	000113523
Srilestari, Suyadi	Reference Book	Web-based Student Assessment Planning System	EC00201860166, 19 December 2018	000129596
Wasito & Suyadi	Reference Book	CD Interactive-based Learning Media of *Tahfidzul Qur'an* (Memorizing Al-Koran)	EC00201860385, 21 Desember 2018	000129809
Suyadi	Book	Early Childhood Learning Theory in Neuroscience Studies	EC00201808026, 4 April 2018	000104464
Umam Mufti and Suyadi	Reference Book	Technical Guidance on the Implementation of *Ibadah Qurban* (Ritual Devotion of Sacrifice)	EC00201860522, 21 December 2018	000129945
Osa Agil Pratama and Suyadi	Reference Book	Adobe flash-based Development of Learning Media to increase student participation in the subject *Aqidah Akhlak* (Faith and Moral Behaviour) class XI at *Muhammadiyah Karangmojo* Vocational High School (SMK)	EC00201860841, 27 Desember 2018	000130193
Nanang Andriyansyah & Suyadi, & Wantini	Reference Book	Android-based Traditional Games	EC00201861117, 28 Desember 2018	000130597
Fera Eka Widayanti & Suyadi	Reference Book	Interactive on Learning Media Media *fikih Thaharah* (ritual devotional cleansing)	EC00201860453, 21 December 2018	000129938
Tito Rrestu Tantowi, Suyadi, & Hendro Widodo	Teaching aid	Monopoly of the Basic Beliefs of Islam (*Rukun Imam*)	EC00201861127, 28 Desember 2018	000130598

Student and lecturer	Type of creation	Innovative work creation title	Number and Date Innovative Work Request (KI)	KI number granted
Suluri & Suyadi	Computer Program	Android-based Development of Learning Media Arabic Language *Mufrodat* (vocabulary) and *Qowaid* (grammar) at *Muhammadiyah* Junior High Schools (SMP)	EC00201861178, 29 December 2018	000130501
Muhammad Arif Darmawan & Suyadi	Reference Book	Android-based Reference book material for Teaching Arabic in Language Laboratories	EC00201900112, 3 January 2019	000130795
Aris Setiawan & Suyadi	Reference Book	Virtual reality media of pilgrimage simulation practice (for *Muhammadiyah* senior high (SMA) and vocational high (SMK) and equivalent schools)	EC00201861171, 28 December 2018	000130607
Tukinem and Suyadi	Computer Program	Learning Method for Memorizing *Asmaul Husna* (Allah's names) with Indonesian Children's Songs	EC00201860070, 19 December 2018	000130879
RR. Ninik barakatul khasanah & Suyadi	Buku Panduan	Macromedia Flash 8.0-based Development of Interactive Learning Media on *salat fardlu* (obligatory ritual prayer) procedures	EC00201861176, 28 December 2018	000130599
Syadana and Suyadi.	Teaching Aids	*TAJWIDUKATIF*: Innovation of Learning Aids for *Tajwid* (pronunciation in reciting Al-Koran) in Islamic Education Subjects (PAI) for Junior High School (SMP) Class VII.	EC00201821939, 24 Juli 2018	000112579
Ranti Andriani Putri, Dwi Tri Astuti.	Teaching Aids	PANAMA (*Papan Asmaul Husna* – names of Allah sign boards)	EC00201823020, 6 Agustus 2018	000113530
Lathifah Istiqomah, Midatu Soleha, et al.	Teaching Aids	Magnets with *Akhlaq Terpuji* (Praiseworthy Deeds)	EC00201821938, 24 July 2018	000112578
Greget Annisa Syawaliani, et al.	Teaching Aids	*QUNANTA* Edu (*Al-Qur'an Injil Taurat Zabur* (Holy Books of David, Torah and the Gospel) Education) in Islamic Education Subjects (PAI) Junior High School (SMP) Class VIII	EC00201823021, 6 August 2018	000113532
Desti Gudiarti	Text book	Learning the Arabic Alphabetic for Primary School Children (SD) Classes 1,2, and 3	EC00201823018, 6 August 2018	000113520
Suyadi, Sumaryati and Dwi Hasturi	Book	Neuroscience-based Journal of anti-corruption learning reflections (for teachers)	EC00201953640, 5 September 2019	000152828
Addinia Rizki Sabili & Suyadi	Book	School culture-based Character Education	EC00201947665, 26 July 2019	000147755
Amien Rais, Suyadi, et al.	Book	*Mutaba'ah mim (tahfidzul qur'an, hadis, dan doa)* (Following the example of the prophet Mohammad (memorizing the Al-Koran, the prophet's sayings, and prayer)	EC00201942583, 17 June 2019	000144382
Apri Wulandari, Suyadi, et al.	Reference Book	Muhammadiyah Multi-media Refence Book Buku	EC00201953236, 2 September 2019	000152522
Desfa Yusmaliana & Suyadi.	Written work (article)	Neuroscience-based Planning Framework and Outline Model of Creative Imagination Berbasis Neurosains (IKBN)	EC00201944692, 4 July 2019	000145098
Istiqomah, Mhd. Lailan arqom, et al.	Reference Book	Board Game of Seven Level Wins in Islamic Education Learning	EC00201948608, 1 August 2019	000148708
Iswanto, Lailan Arqam, et al.	Book	Studying Arabic through songs	EC00201940780, 22 May 2019	000142555

Student and lecturer	Type of creation	Innovative work creation title	Number and Date Innovative Work Request (KI)	KI number granted
Kasno, Mhd. Lailan Arqam, et al.	Reference Book	Refence book and *mutaba'ah Tahfidz Alqur'an* metode *al usrah* (Evualating *Al-usrah* method of memorizing the Al-Koran)	EC00201943790, 24 Juni 2019	000144210
Rafika Dwi Rahmah MZ & Suyadi.	Refence Book	Reference Book of Chemical Experiments in the Learning of *Fiqh* (Islamic jurisprudence)	EC00201945118, 8 July 2019	000145320
Saifurrahman, Suyadi, et al.	Book	Reference Book for memorizing the Al-Koran with the *Juz'i* method	EC00201943810, 24 Juni 2019	000144867
Heru Widi Widodo, Suyadi,	Reference Book	Practical guide for ritual devotions while travelling	EC00201952514, 28 August 2019	000152048
Suyadi, Wikanti Iffah Juliani.	Book	A book for Monitoring the Memorization of Arabic Class 9	EC00201953469, 4 September 2019	000152755
Yarudin, Suyadi.	Book	Book of *Mutaba'ah Gharaibul Qiroah* and *Musykilat* (Foreign readings in the Al-Koran)	EC00201945704, 13 Juli 2019	000146066
Yudi Candra Hermawan, Suyadi, et al.	Reference Book	Reference Book for Application of *Tafhimqu*	EC00201946501, 18 Juli 2019	000146691
Sumaryati, Suyadi, et al.	Book	Anti-corruption Education in the Family, School and Community	EC00201953311, 3 September 2019	000152618
Suyadi, Sumaryati, et al.	Book	Questionnaire Measuring Anti-corruption behavior of early child care education (PAUD) pupils throughout Bawean.	EC00201953638, 5 September 2019	000152832
Suyadi, Sumaryati, Dwi Hastuti, Anton Yudhana, et al.	Technology Device Patent	Neuro-Corruption: Early Detection Device of Corruptive Behavior Brain Wave in Islamic Religous Learning.	S22201907690	S22201907690
Suyadi, Sumaryati, et al.	Book	Neuroscience based Observation Instrument of anti-corruption education implementation.	EC00201953639, 5 September 2019	000152829
Hendro Widodo	Book	School Culture-based Development of *Adiwiyata* (Environmental) Schools (Guidance for Primary Schools)	EC00201978790, 30 October 2019	000161308
Afidz Nurrohman, Mhd Lailan Arqam, et al.	Reference Book	Learning to make EDUGAMES with Construct 2	EC00202026667, 7 Agustus 2020	000197595
Fadilah Husni & Suyadi	Book	Illustrated story-based Learning of *thaharah* (ritual cleansing)	EC00202030128, 31 Agustus 2020	000200505
Ganjar Rachmawan Adiprana, Hendro Widodo.	Module	Module on Implementing Islamic Values of *Wasathiyyah* (moderation) in Learning *Tarikh* (history) Class 7	EC00202030628, 2 September 2020	000201639
Ruri Afria Nursa, Suyadi, et al.	Module	Neuroscience-based Islamic Learning oriented Higher Order Thinking Skill (HOTS)	EC00202023890, 21 July 2020	000195310
Imroatum Muhimmah, Suyadi, et al.	Buku Panduan	Video-based Media for Studying Arabic Alphabet to Introduce the Names of Animals	EC00202024312, 24 July 2020	000195945
Nanang Wahyudi, Suyadi, et al.	Module	Muhammadiyah Module 'Essential Material'	EC00202024803, 27 July 2020	000196050
Nurjanah Wijayanti & Suyadi.	Module	Edutainment-based Module on interactive multimedia on *fiqih* (Islamic jurisprudence) education class VII students, Muhammadiyah 1 Junior High School (SMP), Depok.	EC00202024819, 27 July 2020	000196077
Rahmat Khoirudin & Suyadi	Written work	Character-based Strengthening of *Hizbul Wathan* (Muhammadiyah	EC00202030413, 1 September 2020	000200565

Student and lecturer	Type of creation	Innovative work creation title	Number and Date Innovative Work Request (KI)	KI number granted
		Scouting Movement) at the Introductory Scouting *Purwa* level		
Rani Lestari, Suyadi, et al.	Module	Module on Islamic Education Learning *Akhlak Terpuji* (Praisworthy Deeds)	EC00202025895, 4 August 2020	000196810
Kharisma Noor Latifatul Mahmudah, Suyadi, et al.	Reference Book	Audio visual-based Media *Merahasia* (keeping secrets) Arab Language Learning	EC00202023806, 21 July 2020	000195247
Rafika Dwi Rahma & Suyadi	Reference Book	Reference Book of Chemical Experiments in the Learning of *Fiqh* (Islamic Jurisprudence)	EC00201945118, 8 Juli 2019	000145320
Yaruddin, Suyadi.	Reference Book	Book of *Mutaba'ah Gharaibul Qiroah Dan Musykilat* (Foreign reading in the Al-Koran)	EC00201945704, 13 Juli 2019	000146066
Suyadi, Sumaryati, Waharjani & Trisna S.	Reference Book	A Profile of Anti-corruption Education of the *Aisyiyah Bustanul Athfal* Kindergarden (TK ABA) Perak Mosque Complex Kotagede Yogyakata	EC00202028664, 19 Agustus 2020	000199430
Suyadi, Sumaryati & Dwi Hastuti	Text Book	Early age child Education Innovation	EC00201951047, 16 August 2019	000150567
Suyadi, Waharjani, & Sumaryati	Video	*Da'i* (Muslim preacher) Training: Anticorruption for *Mubaligh* (preachers) impacted by Covid-19 in Prenggan Yogyakarta	EC0020202866, 19 August 2020	000203046

To the best of the researcher's knowledge, there is no other MPAI in Indonesia which, within three years, has successfully done innovative and tested research in accordance with IQF level 8, shown by the attainment of sixty HKI and potential downstream development as shown in Table 1. This attainment has even beaten other study programs of the same type which have already had full accreditation. Because of that, Sy's argument, which is influenced by Syafrinaldi, is more rational than La's which is influenced by Lemley. HKI it can be argued is, on the contrary, able to avoid any innovative research that repeats previous innovative research (repetitive), with research having been tested academically and legally. Lemley's argument, referred to by La, precisely has the potential for illegal repetition – not to say cannibalism even plagiarism – of previous research. In this way, IPKI and HKI academic subject can be made accountable academically.

2) Neuroscience and Learning Theory

Scientifically, one of the factors which underpins curriculum changes is the academic foundation, apart from the legal, sociological and psychological foundations. Academically, the changes and redesign of the curriculum must respond to development of scientific outcomes. Contemporary Islamic educational science has arrived at an interdisciplinary, multidisciplinary, and transdisciplinary approach to concerned with neuroscience [34]. Because of that, the MPAI Study Program has included neuroscience in the curriculum by placing it in learning theories, as a result the academic subject's name is 'Neuroscience and Learning Theory'. On this, Sy states:

> "MPAI needs to study neuroscience or science of the brain, because so far teachers are the one and only profession whose daily work is to change the brain, but do not yet understand how the brain works! As a consequence, Islamic education gives the impression of being pedagogically doctrinal and not rational and empiric." (Si, MPAI UAD Lecturer).

Sy's idea to include neuroscience in the curriculum has received varying responses from other MPAI lecturers:

Hw : This is Sy's own field of expertise! If all lecturers submit their own field of expertise to become an academic subject, how many academic subjects will be created?

Wt : Neuroscience, it's sufficient to just put it one of the learning theories, added to behaviourism, cognitivism, and constructivism.

Jp : Perhaps neuroscience is a better fit in method or learning strategies, such as brain-based learning, quantum learning, accelerated learning and so on.

[a.] (Excerpts from Focus Group Discussion [FGD] with lecturers in MPAI-UAD).

Hw's statement is correct, Sy is quoting her own research concerning a basis of thinking leading to new knowledge as seen in the words "Neuroscience and Islamic Education with its variety of forms" [35]–[38]. Although the argument is very subjective, there is an extensive amount of literature which has been quoted by Sy. Just as an example, Sousa states teachers are the one and only profession whose daily work changes the brain [39]. But, according to Sylwester, for centuries teachers have been changing the brains of those being educated without any knowledge at all of brain science [40]. By referring to these references, Sy cannot be said to be completely subjective, but in the tradition of qualitative research analysis, Sy uses an intersubjective logic [41].

Hw's statement in fact uses more of a political approach [42], not academic, as consequence is less thorough in analyzing the theoretical argument conveyed by Sy. In fact, in the MPAI-UAD study program only Sy has proposed a new MK furnished with sufficient references. On Wt's statement it indeed uses an academic approach, because it is based on satisfactory referencing that is, Olson's book on learning theory, and states that neuroscience it is one of its chapters [43], [44]. Likewise, with Jp's statement, which indeed to date, brain-based learning strategies are considered to represent neuroscience. However, both Wt and Jp have not yet studied the latest theory in neuroscience and education which states that learning strategies labelled as 'learning' is only a make-shift effort which gives the impression of being forced to implement neuroscience in learning practice [45], [46]. Si responds in detail to the various objections by saying:

> The incorporation of neuroscience in Islamic education level 8 is not just pure neuroscience which is without a connection to Islamic pedagogy, but hybradized and integrated with Islamic pedagogy itself as a result creating a new formula. The trail of neuroscience can be traced in Islamic studies beginning with levels of logical concepts of Ibu Sina to the logical semantic field in the Al-Koran, such as *ta'qilun* (to understand), *ya'qilun* (to seek knowledge), *tafakkur* (to think), *tabaṣṣur* (insight), *tadabbur* (to contemplate), and so on. After hybridization is done, then theory is discussed and neuroscience-based Islamic educational method or labelled as 'learning' as stated by Wt and Jp." (Si, MPAI-UAD Lecturer).

Si's statement it is clear can be analyzed easily in various Islamic literature in particular *Tafsir Salman* (a science-based interpretation of the Al-Koran) which understands '*aql* (to think) in the Al-Koran as function of the brain in neuroscience [47]. Sy also quotes the opinion of Quraish Shihab who states that the word *'aql* is repeated 49 times, all of them in the form *fi'il mudhari'* (present or future tense), primarily materials which are connected to *wawu jama'ah* (the congregation), such as the forms *ta'qilun* or *ya'qilun* [48]. Whereas the word *ta'qilun* is repeated twenty-four times and the verb *ya'qilun* twenty-two times, the words *'aqala*, *na'qilu*, and *ya'qilu* ('to understand') are found just once each [49]. In the view of the researcher, Si once again uses the logic of intersubjectivitas in supporting her new ideas to create a new academic subject in the development of the MPAI curriculum. The inclusion of neuroscience in Islamic education is not something new, because to date neuroscience is already included in several other scientific disciplines, such as psychology which then gives birth to new scientific branches that is, neuropsychology; marketing (neuromarketing), linguistics (neurolinguistics), leadership (neuroleadership), and others [50].

Despite this, the fact is the emergence of the new academic subject is not Islamic Education Neuroscience as its own research discipline as is in Hw's criticism, but Neuroscience and Learning Theories (NTP). This shows that Si is able to accept suggestions and criticism, primarily from Wt with his theoretical arguments. In this way, behind Si's logic of intersubjectivity is found a logic of humanity that is, an appreciation of other truths. Because of that, Si's ideas and concepts are no longer just intersubjective but also interobjective. Further, the MPAI integrates learning, research, and service to the community in all its academic subjects in particular, the new subject of Neuroscience and Islamic Education Theory. If for the subject 'Islamic Religious Learning Innovation and HKI' its outcome is the acquisition of HKI, so the outcome of the subject 'Neuroscience and Learning Theory' is publications. Because of that, it is natural if MPAI publications occupy the first ranking in the Google Scholar data base based on the Kemenristekdikti Index Sinta.

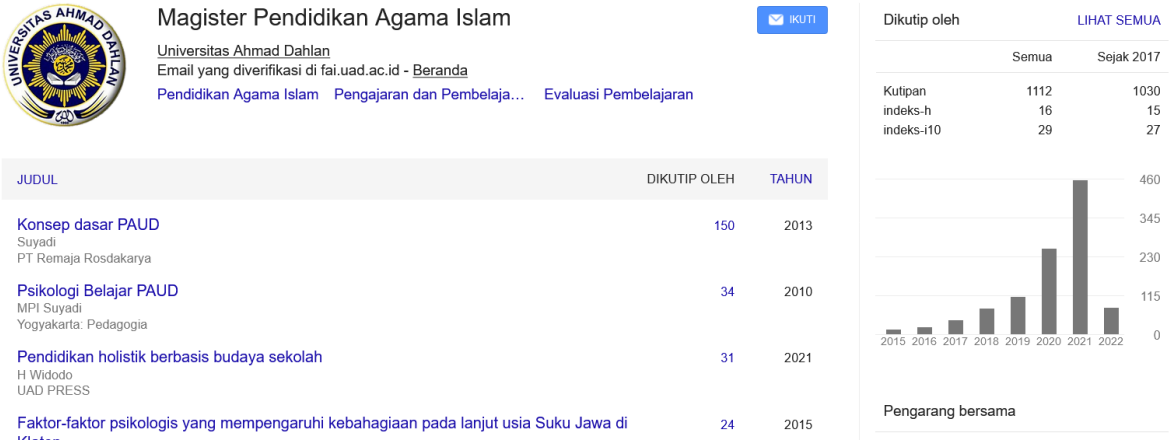

Fig. 2. Islamic Education Master's Study Program in the Google Scholar data base

Figure 2 is a profilr of the Islamic Education Master's Study Program in the Google Scholar data base. Specifically, the publication resulting from the integration of learning, research, and service in the subject of Neuroscience and Islamic Education Theory is as shown in Table 3. Lecturers and guidance staff, apart from giving theoretical material, more often give academic guidance on how students can find and construct knowledge through publications, outcome-based, mini-research. In this way, the inclusion of neuroscience and Islamic education learning theory has mobilized lecturer and student research to publish in accredited national journals and reputable international journals. This is evidenced by the number of MPAI Study Program publications both from lecturers and students.

Table 3. MPAI lecturer and student publications on neuroscience and Islamic education

Name	Title	Journal	Level
Desfa Yusmaliana, Suyadi & Hendro Widodo	Creative Imagination Base on Neuroscience: A Development and Validation of Teacher's Module in Covid-19 Affected Schools.	UJER, 8(11B): 5849-5858, 2020	Scopus Q3
Kharisma N. L. M., & Suyadi	Ibnu Sina's Logic Steps and Bloom's Taxonomy in Islamic Education, a Neuroscience Perspective	Edukasia Islamica, Vol. 5 No. 1, Juni 2020, hlm. 121-138	Sinta 2
Astuti Budi Handayani, Suyadi	The relevance of Ibnu Sina's logic steps in Islamic education in the millennial era.	Ta'dibuna, Vol. 8, No. 2., 2019: hlm. 222-240	Sinta 3
Muhammad Faiz Rofdli & Suyadi	Interpreting Neuroscience Verses (*'Aql* (Understanding) in the Al-Koran and its Relevancy to Developing Critical Thinking in Islamic Education)	Jurnal At-Tibyan, Vol. 5 No. 1, Juni 2020 (h.138-152).	Sinta 3
Ahmat Miftakhul Huda & Suyadi	The Brain and Logic in the Study of the Al-Koran and Neuroscience	Jurnal Pendidikan Islam Indonesia, Vol. 5, No. 1., 2020	Sinta 4
Desfa Yusmaliana & Suyadi	Neuroscience-based Development of Creative Imagination in Islamic Learning	Edukasia: Jurnal Penelitian Pendidikan Islam, Vol. 14, No. 2., 2019, hlm 267-296	Sinta 2
Apri Wulandari & Suyadi	Neuroscience perspective of Developing positif emotions in Islamic education.	Tadrib: Jurnal Pendidikan Agama Islam, Vol. 5, No.1 , 2019, hlm 51-67.	Sinta 5
Awhinarto & Suyadi	The Brain and Character in Islamic Education: A Neuroscience based Critical Analysis of Islamic Character Education.	Jurnal Pendidikan karakter, Tahun X, No.1, April 2020	Sinta 3
Ranu Suntoro	The Concept of Al-Farabi Stepped Logic from a Neuroscience Perspective and its Relevance to Science Learning in a *Madrasah* (Islamic School)	Risalah: Jurnal Pendidikan dan Studi Islam, Vol. 6, No. 2, 2020	Sinta 4
Fadilah Husni, Suyadi	Mirror Neuron In The Perspective Of Islamic Education.	Edukasi, Vol. 08, No.2., 2020: 26-35	Sinta 4

Name	Title	Journal	Level
Desfa Yusmaliana, et al.	Constitutional Piety: The Integration of Anti-Corruption Education into Islamic Religious Learning Based on Neuroscience	J-PAI: Jurnal Pendidikan Agama Islam Vol. 6 No. 1., 2019	Sinta 4
Imroatum Muhimmah & Suyadi	Neuroscience and Spirituality in Islamic Education	Tadris: Jurnal Pendidikan Islam; Vol. 15 No.1, 2020.	Sinta 3
Zunaidi M Rasid Harahap, Suyadi	The Development of Character of Education through a Behavioral Approach based on Neuroscience at the Purbayan Muhammadiyah Primary School (SD).	Psikoislamedia Jurnal Psikologi, Vol. 05 No. 01, 2020	Sinta 4
Nurjanah Wijayanti & Suyadi	Rational and Intuitive Brains In Islamic Education: Analysis of Al Ma'un Theology In The Neuroscience Perspective.	Edukasi,Volume 08,Nomor 02, November 2020: 1-25	Sinta 4
Istiqomah, Astuti B. H., & Suyadi	The Relationship between the Compulsive Gamer dan Disturbances in the Brain's Limbik Sistem in Islamic Religious Learning.	Muaddib, Vol. 9., No. 2, 2019. 131-153	Sinta 4
Saifurrahman & Suyadi	Neuroscience-based Design of Islamic Religious Studies.	AL-MURABBI: Jurnal Studi Kependidikan dan Keislaman, Vol. 6, No. 1 (2019)	Sinta 4
Kasno	*Aql* (Understanding) and the Brain in Neuroscience Studies and its Implications for a Scientific Approach in Islamic Education.	Mu'adib, Vol. 9., No. 2., 2019, hlm 154-177	Sinta 3
Ruri Afria Nursa & Suyadi	The Concept of Al-Farabi Stepped Logic in Neuroscience Theory and its Relevance to Islamic Education.	Tawazun: Jurnal Pendidikan Islam, Vol. 13, No. 1, 2020: 1-17	Sinta 4
Amien Rais & Suyadi	The Development of Spiritual Intelligence in Islamic Education with a Neuroscience Approach.	Mu'addib, Vol. 09 No. 02 Juli-Desember 2019	Sinta 4

Table 3 provides evidence that the inclusion of the new academic subject in particular, 'Neuroscience and Islamic Education Learning Theory' has mobilized MPAI lecturer and student research to provide new findings and fresh insights. In addition, this research which is in the Google Scholar Data Base has become a special characteristic of the MPAI-UAD Study Program publications. This is evidenced by doing a search on the Google Scholar Data Base using the key words: 'Islamic education, neuroscience, logic, and brains in the Al-Koran' (*pendidikan Islam, neurosains, akal, dan otak dalam Al-Qur'an.*' [51]–[53]. Based on a search of these key words, the publications which appear are mostly articles which have been written by MPAI lecturers and students.

4. Conclusion

Based on the analysis and discussion, it can be concluded that the MPAI-UAD Study Program, although only commencing in 2017, with its curriculum planned as an integration of an outcome-based learning, research and service in particular, publications and HKI, at precisely three years of age or in 2020, the Study Program gained full accreditation. The academic subject 'Islamic Religious Learning Innovation and HKI' has encouraged lecturer and student research to produce innovative and tested work which is shown by the acquisition of sixty innovations. On the academic subject 'Neuroscience and Learning Theory' as a new discipline, it has tried to change the earlier 21st century learning paradigm which is still pedagogically doctrinal to become rational and empiric. The emergence of both subjects evidence that this study program has been prepared to win the competition and collaboration in the era of disruption or industry revolution 4.0. Despite this, the research has limitations that is on the social, cultural, and economic impacts as a consequence of the logic of downstream development of innovative research results. Because of that, this research recommends further research be conducted focusing on the impact of both these subjects in particular the wider downstream development in the community. It is important this be done so as to know that the MPAI Study Program research results of its lecturers and students are not only innovative and tested but also have a sociological impact or potential downstream development.

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