Content Analysis of SHS Mathematics Curriculum Based on Independent Learning

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Abstract. **The purpose of this study is to analyze the suitability between content with curriculum objectives in the SHS mathematics curriculum based on independent learning. To obtain data, using document and interview techniques, and research locations at SMAN 8 Malang. Documents include UKBM (the independent learning activity unit) book and the national curriculum, while interviews were used to check document data. Suitability analysis includes the suitability between mathematics subject matter and student activities with UKBM based curriculum objectives, and the suitability scale uses a Likert Scale. The document and interview data were analyzed qualitatively to describe the suitability level. Based on the results of the analysis, that there is no match between teaching material and learning activities with UKBM objectives. UKBM books such as a collection of learning plans, and lots of practice questions. Overall it is not related to independent learning. In its implementation, students do not learn independently, and they prefer learning together, learning the same material, and the same learning activities. The results of this study are expected to be useful for the theory of the development of mathematics curriculum, especially the UKBM-based curriculum. In addition, as an evaluation of the implementation of UKBM at SHS in Malang.**

Keywords: content analysis, mathematics curriculum, independent learning, UKBM

INTRODUCTION

Independent learning is very crucial when students study at university [1]. Usually, the first year is a transition period, and in this period, many students have difficulty adapting to the learning model at university [1], [2]. Basically, independent learning is a process, method, and philosophy of education, so students acquire knowledge on their own and develop their abilities for inquiry, and critical evaluation [2],[3]. Independent learning also includes freedom that is responsible for determining the process and learning objectives [3]. This freedom must be in accordance with the rules and in the monitoring of academic advisors. Independent learning is the need of each person individually, and those concerned are responsible for learning independently in achieving their learning goals [2], [3]. Therefore, this independent learning must be familiarized since students are in school, at least in Senior High School (SHS).

In the national curriculum (K-13) and other references, mathematics learning is a process of how to find and construct mathematical concepts from real problems with scientific approaches [4], [5]. Independent learning in mathematics learning covers many contexts and situations where students independently interpret and develop new knowledge and skills, and are supported by their environment. Independent learning does not mean learning in isolation, but it can also be in a learning community (for example collaboration), but independently carry out learning activities to achieve learning objectives [3], [6], [7]. The process of learning mathematics based on independent learning activities can increase the attitude of independence and self-confidence of students because they must be involved individually in achieving learning objectives [2], [16]. This selfevidence can influence student achievement [8] – [10], [11], [12], [13]. So, in the process of learning mathematics it is recommended to use the principles of constructive learning with discovery or inquiry learning, problem or project-based learning, and use scientific approaches [2], [3], [4], [11], [14].

UKBM is a unit of independent learning activities, which is oriented towards students with a semester credit system, where the aim is to increase the independence and involvement of students in achieving learning goals [2], [3], [6], [8]. UKBM is a form of learning that is designed to facilitate individual students so that students can complete the burden of learning in accordance with their abilities, talents, interests, and speed of learning. Development of UKBM-based math books based on textbooks, where the material is organized into small units based on competency mapping, from easy to difficult, and from simple to complex [3]. UKBMbased learning is an independent learning strategy to help students individually achieve mastery learning [8], [15]. UKBM not only improves the quality of graduates but also improves the understanding and ability of teachers in developing learning based on independent learning [3], [8]. So, this UKBM needs to be developed by teachers and applied in classroom learning.

Two aspects can be developed in UKBM-based mathematics books, namely teaching material and learning activities. These two aspects were developed based on independent learning [3], namely Core Competence (CC) and Basic Competence (BC)-

based material, from easy to difficult, student-centered learning, based on independent activities, individual mastery learning, serving fast learners and slow individually, characterized, meaningful learning, technopedagogical content knowledge, 4C (critical thinking, creativity, collaboration, communication), interactive, and HOTS (higher order thinking skills). Based on several aspects above, the UKBM is a curriculum, namely the implementation curriculum. So, this UKBM-based mathematics learning must be evaluated both document and implementation. The curriculum is said to be good if the curriculum documents are good, and the curriculum can be applied well in the class [16], [17]. The question is how to content analyze of mathematics curriculum base on UKBM.

METHOD

To answer these questions, it is necessary to determine the method and constraints to be studied. Analysis of UKBM-based mathematics curriculum content is an analysis of the suitability of mathematics material and student learning activities with the learning objectives of UKBM [3], [18]. Aspects of teaching materials focused on: 1) the development of materials using a spiral approach, making it easier for students to learn independently, and increase students for active learning; 2) the suitability of the material with CC and BC, thus increasing attitudes about critical, creative, constructive, character, and HOTS; 3) teaching materials according to the needs and abilities of students, and students are able to do their own evaluation of the mastery of learning; and 4) learning is realistic and uses other learning resources including ICT (information and communication technology). Thus, learning activities are focused on: 1) independent learning without the help of others, collaborating through inquiry or scientific approaches with the problem-based learning model; 2) able to think critically, creatively, and have character; 3) communicating the results of learning by doing active interactions, and evaluating learning activities independently.

To obtain these data, an analysis of the UBKM Mathematics book was published by MGMP (consultation for subject teachers) SHS Mathematics in Malang, then conducted observations in class, and interviews with mathematics teachers using the UKBM [19 - [22]. This UKBM book covers compulsory lessons and specialization lessons for grade X and XI which are used in SHS in Malang [23], [24]. To test the validity of the data, especially the UKBM content and its implementation in the classroom, triangulation of techniques was used, namely conducting interviews with mathematics teachers at SMAN 8 Malang [14], [19- [21]. To analyze the suitability of using a Likert Scale with four categories of choices, they are: very unsuitable, not suitable, suitable, and very suitable. Document

and interview data were analyzed qualitatively to describe the suitability level. To calculate and analyze it, the data is transformed into quantitative data with score: 1, 2, 3, and 4 [3]. After being transformed then to determine the rating scale, using percentages, and classified into four categories, which are very unsuitable, not suitable, suitable, and very suitable, with intervals are: $0 - < 25; 25 - < 50; 50 - < 75;$ and $75 - 100$ [18] - [22].

RESULT & DISCUSSION

The UKBM Mathematics book used at SHS Malang was not written in the year of publication but was registered at SMAN 8 Malang, January 18, 2018 [23], [24]. This UKBM book is not standardized either in fonts, tables, images or formats. There is not even an introduction that explains what this book includes, for whom, and how to use it. This book also does not fulfil aspects of the components, characteristics, and principles of developing UKBM books [3]. On the basis of these three aspects, the suitability analysis is focused on two suitability, namely the suitability of mathematics teaching materials with the goals of UKBM, and the suitability of student learning activities with the goals of UKBM [18].

The main purpose of UKBM-based learning is to provide stimulus to increase independent learning and student involvement in mastering competencies [3], [6], [8], [15], [2]. For this reason, teaching materials must be easily studied by students without the help of others and must be able to increase student learning activities [4], [15]. Teaching material must be developed according to CC and BC, using a spiral approach, and meeting the needs and abilities of students. Learning must be realistic, easy to learn independently and utilize ICT as a source of learning. Development of teaching materials must be able to improve critical, creative, constructive, character, and HOTS attitudes, and are based on mastery learning and self-evaluation [3]. Based on these aspects, the development of teaching material in the UKBM book published by MGMP is not suitable (with a level of suitable of only 46.44%) with the aim of UKBM. The development of materials in the UKBM book based on BC was only derived from CC-3 and CC-4, so that the characters that appeared were only their mathematical characters. The BC used is the general BC from the national curriculum, where the cognitive level is not up to creative construction. The learning resources in this UKBM book are only textbooks, and less use of other sources including less use of ICT, whereas in the UKBM development guidelines it is recommended to add other references and includes the use of ICT.

Independent learning and student activity in learning are the goals or profile of the UKBM. This profile must be developed into CC, BC, and indicators, so that it is clear what the standards and indicators are for the independence and activeness of

students in learning [16], [17]. Based on these standards and indicators, teaching materials were developed. In the development of teaching materials must consider the problem of the order and scope of teaching materials, so as not to overload and overlap material both horizontally and vertically [17]. Development of material like this, never existed, if the curriculum is perennial and centralistic. Because this model curriculum tends to like uniforms and impose, compared to a variety and as needed [18].

After developing the material, it then determines how to learn it. Student activities in learning based on UKBM are expected to be able to learn independently and or collaborate through inquiry or scientific approaches with Problem Based Learning, so students are able to think critically, creatively, and have character. In addition, being able to communicate learning outcomes interactively and be able to evaluate their own activities [3]. Based on these aspects, the student activities in the UKBM book published by MGMP is not suitable (with a level of suitable of only 44.79%) with the UKBM objectives. The learning design in the UKBM book looks like a collection of learning plans, and the difference is on many practice questions. It must be understood that the main purpose of UKBM is not mastery of teaching materials, but to increase learning independence so that students are able to learn on their own even without the help of teachers or others [1], [2],[4], [6]. Therefore, in the UKBM book, students must be able to improve independent learning both individually and collaboratively. So students have the ability to think critically, creatively, interactively, and have character [2],[3].

UKBM-based learning in the classroom is no different from regular learning. Where learning is carried out together, learn the same material and activities, with the same evaluation instruments, and the implementation is also concurrent. Some students can learn quickly, that is, finish first learning certain material or all material, but they do not study the next material or do not test first. The reason is waiting for another friend. Actually, many factors influence it, for example, students lack of confidence and uncompetitive. The teacher is also not able to serve all students individually, and the teacher is not ready and lacks understanding of all teaching materials in one meeting [8].

The development of UKBM-based learning is not easy, because its philosophy and orientation are different from regular classical learning. Regular classical learning is perennial and inhuman. UKBMbased learning is one example of humanist learning, where learning is designed to serve independent learning students achieve learning goals according to their abilities, needs, talents, interests, and speed of learning [5] ,[16]. Although there are still standards in learning, these standards are used to measure the success of independent learning, not to measure the mastery of teaching material.

CONCLUSION

The aim of learning UKBM-based mathematics is to increase the activity of independent learning. Independent learning is not an isolation of learning, it can also be in the learning community, but the achievement of learning objectives is done independently. Independent learning can increase self-confidence and improve learning outcomes. So, UKBM-based mathematics learning needs to be developed and applied in schools, but the development of UKBM books and their implementation must be in line with the main objectives of UKBM-based learning. UKBM-based mathematics learning in SMA / MA Malang is already 3 years. There are schools and teachers who have not used it, because it is not effective in achieving learning objectives. Besides the many factors that influence it, the main factor is the disorientation of the UKBM goals. The main purpose of UBKM learning is not mastery of teaching material, but independence in learning.

REFERENCES

[1] S. Zutshi. *Undergraduate Student Acceptance of a Unit Design for Developing Independent Learning Abilities*. Journal of University Teaching and Learning Practice. Vol.3 Isue.3 Article 7, 2011.

[2] The Higher Education Academy. *Independent Learning*. The Higher Academy Innovation Way York, 2014.

[3] Science Park Heslington York YO10 5BR +44 (0)1904 717500. enquiries@heacademy.ac.uk. Direktorat PSMA. *Panduan Pengembangan UKBM. Direktorat DikDasMen*, Kementrian Kebudayaan dan Kebudayaan, 2017.

[4] Dodik Mulyono. *The Influence of Learning Model and Learning Independence on Mathematics Learning Outcomes By Controlling Students' Early Ability*. International Electronic Journal of Mathematics Education E-Issn: 1306-3030. 2017, Vol. 12, No. 3, 689-708, 2017.

[5] Junaedi. *Humanistic Approach to Teaching the Course in Mathematics*, 92–95, 2012.

[6] F. Hermawan. *Pengembangan UKBM Digital Pada Materi Pertidaksamaan Eksponen*. Jurnal Pendidikan Matematika. ISSN 2615-3939. Vol. 2 No.2, 2019.

[7] Pratiwi, I. D., & Laksmiwati, H. *Kepercayaan Diri dan Kemandirian Belajar Pada Siswa SMA Negeri "X."* Jurnal Psikologi Teori Dan Terapan, 7(1), 43. https://doi.org/10.26740/jptt.v7n1.p43-49, 2016.

[8] F. Hermawan, *Pengembangan UKBM Digital Pada Materi Eksponen*. Jurnal Pendidikan

Matematika, 2(2), 210–221, 2019. Retrieved from http://journal.stainkudus.ac.id/index.php/jmtk.

[9] W. Hidayat, *Kemampuan berpikir kritis matematis dan kepercayaan diri siswa SMA Pasundan*. Journal of Research in Mathematics Learning and Education, 2, 116–122, 2017.

[10] A. Isroila, et.al. *Pengaruh Self Confidence Terhadap Pemahaman Konsep Siswa Melalui Penerapan Model Problem Based Learning*. Jurnal of Natural Science Education Research, 1(1), 1–8. Retrieved from https://journal.trunojoyo.ac.id/nser/article/view/4151, 2018.

[11] S. Nurkholifah, et.al. *Hubungan Antara Self Confidence Dengan Kemampuan Berpikir Kritis Siswa Dalam Pembelajaran Matematika*. Edumatica, 08(01), 58–66, 2018. Retrieved from https://www.researchgate.net/publication/.

[12] I. Vandini, *Peran Kepercayaan Diri terhadap Prestasi Belajar Matematika Siswa*. Formatif: Jurnal Ilmiah Pendidikan MIPA, 5(3), 210–219, 2016. https://doi.org/10.30998/formatif.v5i3.646.

[13] Wulandari, & N. Sinambela, *Hubungan Kepercayaan Diri (Self-Confidence) Dengan Kemampuan Pemecahan Masalah Matematika Siswa Dengan Menggunakan Model Problem Based learning Di MAN Kisaran*. Inspiratif : Jurnal Pendidikan Matematika, 3(2), 2017. https://doi.org/10.24114/jpmi.v3i2.8992.

[14] U. Kopzhassarova., et.al. *Enhancement of Students' Independent Learning Through Their Critical Thinking Skills Development*. International Journal of Environmental & Science Education. 2016, VOL.11. NO.18,11585-11585, 2016.

[15] S. H. Sudarmono, *Efektifitas Penggunaan Unit Kegiatan Belajar Mandiri (UKBM) Dalam Mengembangkan Kognitif Siswa Pada Mata Pelajaran PAI di SMA Negeri 3 Sidoarjo*. 4, 5–10, 2019.

[16] M.M. Effendi, *Analysis of Humanist Education on VHS Mathematics Curriculum*: The 6th International Conference on The Community Development 2019, 2019. https://www.atlantis-press.com/proceeding/iccd-19/125919091.

[17] R. Fogarty, *The Mindful School: How to Integrate the Curricula*. Palatine, Illinois: IRI/Skylight Publishing, Inc, 1991.

[18] M.M. Effendi. *Analysis of Relevance of VHS Mathematics Curriculum Development*: Journal Advances in Social Science, Education and Humanities Research, 2018. ISBN: 978-94-6252-4941. ISSN: 2352-5398; DOI:10.2991/incomed-17.2018.1.

[19] L.R, Gay, et.al. *Educational Research: Competencies for Analysis and Applications*. New Jersey: Pearson Prentice Hall, 2006.

[20] J.H. McMillan. *Educational Research: Fundamentals for The Consumer*, 5th Edition USA: Person Education, Inc, 2008.

[21] Sugiyono. *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung; Alfabeta, 2008.

[22] Sukmadinata. *Metode Penelitian Pendidikan*. Bandung: Remaja Rosdakarya, 2010.

[23] MGMP Matematika. *UKBM Matematika Peminatan Kelas X dan XI SMA/MA*. MGMP Matematika Kota Malang, 2018.

[24] MGMP Matematika. *UKBM Matematika Wajib Kelas X dan XI SMA/MA*. MGMP Matematika Kota Malang, 2018.