CRMS

by Mf2 F2

Submission date: 29-Nov-2021 09:03AM (UTC+0700)
Submission ID: 1714626489
File name: mf_IJEME_2021-18968-54031-1-ED.pdf (856.37K)
Word count: 6379
Character count: 33860

International Journal on Emerging Mathematics Education (IJEME)
Vol. 5, No. 2, September 2021, pp. 21-36
P-ISSN: 2549-4996, E-ISSN: 2548-5806, DOI: http://dx.doi.org/10.12928/ijeme.v1i2.18968

Mathematics Curriculum Review in Senior High School Using Curriculum Review Mapping System (CRMS)

[1]Fatimah Rahmawati, [1]Iin Habibah Muttaqin, [1]Maman Fathurrohman, [1]Ihsanudin
[1]Department of Mathematics Education, Universitas Sultan Ageng Tirtayasa, Serang, Indonesia
e-mail: mamanf@untirta.ac.id

Abstrak

Kurikulum 2013 yang saat ini sedang diterapkan di Indonesia, ternyata masih menyimpan banyak kendala dalam pelaksanaannya. Salah satunya adalah kendala dalam membuat rencana pembelajaran. Terdapat alat yang dapat membantu guru dalam membuat rencana pembelajaran menjadi lebih baik lagi yaitu alat bernama Curriculum Review Mapping System (CRMS). Penelitian ini bertujuan untuk mengetahui hasil analisis kurikulum nasional bidang matematika di SMA menggunakan CRMS dan juga respon guru terhadap hasil tersebut. Penelitian ini menggunakan metode deskriptif dengan pendekatan kualitatif. Instrumen yang digunakan adalah dokumentasi, wawancara dan peneliti sendiri. CRMS menggunakan suatu teknologi bernama mapping system untuk menganalisis kurikulum. Penjabaran hasil analisis kurikulum nasional terdapat di dalam bagian pembahasan. CRMS dapat digunakan sebagai alat analisis rencana pembelajaran guru sebagai persiapan guru sebelum guru mempresentasikan pembelajarannya di kelas.

Kata Kunci: Kurikulum matematika, Tinjauan Kurikulum, Curriculum Review Mapping System

Abstract

Curriculum 2013 that is currently being implemented in Indonesia, still holds many obstacles in its implementation. One of them is the constraints in making a lesson plan. Some tools can help teachers create better lesson plans, one of which is a tool called Curriculum Review Mapping System (CRMS). This research aims to find out the results of national curriculum analysis in mathematics in high school using CRMS and also teacher response to these results. This study used descriptive methods with a qualitative approach. The instruments used are documentation, interviews, and researchers themselves. CRMS uses a technology called a mapping system to analyze the curriculum. The description of the national curriculum analysis results is contained in the result and discussion section. CRMS can be used as a teacher lesson plan analysis tool as teacher preparation before the teacher presents his/her learning in the classroom.

Keywords: Mathematics Curriculum, Curriculum Review, Curriculum Review Mapping System

How to Cite: Rahmawati, F., Muttaqin, I.H., Fathurrohman, M. & Ihsanudin. (2021). Mathematics Curriculum Review in Senior High School Using Curriculum Review Mapping System. *International Journal on Emerging Mathematics Education, 1*(1), 1-8. http://dx.doi.org/10.12928/ijeme.v1i2.18968

INTRODUCTION

In 2014 listed in nawacita (nawacita is the nine priority agenda of the working cabinet of the government of Indonesian President Joko Widodo), one of them is the 'Program Indonesia Pintar' or Smart Indonesia Program (one of the running programs from nawacita), which is mandatory to study twelve years free of charge. This encourages students to continue their studies to the high school level. One of the subjects studying high school is mathematics (Republic of Indonesia Law Number 20 the Year 2003 regarding the National Education System). Mathematics is one of the

Received April 9, 2021; Revised July 3, 2021; Accepted August 17, 2021

branches of science that contributed greatly to the advancement of science and technology (Kusmaryono, 2014). Mathematics becomes a foundation of science that can be used in various areas of life. Gravemeijer, Stephan, Julie, Lin, & Ohtani (2017) in their research stated that mathematics education deserves focused attention in STEM (Science, Technology, Engineering, and Mathematics) because of the way computerization affects mathematics and vice versa. Mastering and create future technology requires a strong mastery of mathematics from an early age (Santi, Sugiarti, & K, 2015). The mathematics curriculum in senior high school is predominantly for the preparation of students to take the tertiary study at university of college levels (Fathurrohman, Porter, Worthy, Abdullah, Supriyanto & Pamungkas, 2019).

The curriculum is a crucial aspect in determining the success of a country's education (Setiadi, 2016). Lee (2010) concluded that a curriculum is said to be good if it is successfully implemented. To make the curriculum a success, it has to be considered in connection with teachers, students, and many other determining factors. In Indonesia, the current curriculum applied at the level of primary to secondary education units is the curriculum 2013 (Palobo, Sianturi, Marlissa, Purwanty, Dadi, & Nur, 2018). The orientation of the 2013 curriculum is the improvement and balance between attitude, skill, and knowledge competencies (Ikhsan & Hadi, 2018). The curriculum has two aspects, namely as a plan that should be used as a guideline for the implementation of the teaching-learning process, and as a tool to achieve educational goals (Rifai, Fauzan, Wahdi, & Bahrissalim, 2014). To run the curriculum, which contains a learning design to be implemented, a learning plan is needed to implement the curriculum. According to Regulation of the Minister of Education and Culture Number 22 of 2016 concerning Basic and Secondary Education Process Standards, learning planning can be designed into the form of a syllabus and lesson plan which refers to the standard content of the curriculum. The preparation of learning planning through the preparation of the lesson plan is one of the stages implemented by teachers in the development of the 2013 curriculum (Wulandari, 2019).

On the other hand, Haslina, Yusrizal, & Usman (2017) showed that the ability of teachers in the implementation of the 2013 curriculum has been good but not optimal especially in learning planning in the preparation of the lesson plan is not systematic. The implementation of learning does not apply to the active participation of learners. Palobo, Sianturi, Marlissa, Purwanty, Dadi & Nur (2018) also concluded in their result that teachers had difficulties in developing learning tools based on the curriculum 2013. Teacher difficulties included the development of core activity activities. Ernawati & Safitri (2017) also concluded in their research that the lesson plans that have been compiled by teachers have not been fully by the 2013 curriculum and there are some difficulties experienced by teachers in the preparation of lesson plans. One of the difficulties experienced by teachers in arranging lesson plans according to Ernawati & Safitri (2017) is the difficulty of teachers in choosing approaches/methods/strategies of learning and also the difficulty of teachers in developing learning activities. To overcome or minimize these difficulties, teachers can do activities to review the lesson plan that has been created, to see if the lesson plan has applied aspect of curriculum 2013 such as active participation students, teachers can develop core activities or learning activities that are more varied, teachers can choose more varied approaches/methods/strategies, it will make the learning applied later will be more varied and not monotonous so that teachers can make learning activities in accordance with the needs of learning in the curriculum 2013. Muttaqin,

Rahmawati, Fathurrohman, & Santosa (2020) stated in their research that the teacher needs to review the lesson plans that have been made, to review the lesson plans in the traditional or old fashioned way is sure to be quite time-consuming and very inefficient. Muttaqin, Rahmawati, Fathurrohman, & Santosa (2020) suggest that to shorten the time or streamline the time in reviewing lesson plans, teachers need tools that can help in reviewing the curriculum and learning plans. There are tools to help teachers in reviewing curriculum and learning planning, called Curriculum Review Mapping System (CRMS). CRMS is a web-based application that serves to review curriculum, based on a mapping system by developing the use of the Learning Design Map (LDMAP). LDMAP is based on XML technology developed by Fathurrohman, Porter, Worthy, Abdullah, Supriyanto & Pamungkas (2019). The results of CRMS are presented into six sections: Subject Information, Designer, Resources, Task, Supports, and MSC. This study will answer some questions about the use of CRMS: (a) what are the results of the analysis of the national curriculum in mathematics in senior high school using the CRMS? (b) how do teachers respond to CRMS analysis results?

RESEARCH METHOD

This research is a descriptive study with a qualitative approach. According to Sukmadinata (2005), descriptive research in educational research and teaching curriculum is quite important, describing the phenomena of educational activities, learning, curriculum implementation at various types, levels, and units of education. According to Hikmawati (2017), descriptive research is a study that is intended to gather information about the status of an existing symptom, i.e the state of symptom according to what is in place at the time of the study is carried out without intending to make conclusions that apply to the public or generalization. That's because the results of the analysis conducted using the CRMS will present data in the form of visuals (bar diagrams). Then the data will be described and analyzed without intending to generalize it. Then there is also the analysis of the results of the teacher's interview about their response to the results of the CRMS analysis.

The objects used in this research are the lesson plan data and compulsory mathematical syllabuses in grades X, XI, and XII. The research was conducted at one of the state senior high schools in Serang City. The respondents taken in this study were as many as six teachers in mathematics. The instruments used in this study are non-test instruments, namely documentation, interview guidelines, and researchers themselves. Miles and Huberman argue that qualitative data analysis is conducted interactively and continues until the data is saturated (Sugiyono, 2013). Activities in qualitative data analysis include data reduction, data display, and conclusion drawing/verification (Sugiyono, 2013).

This research is carried out in three stages namely (1) The preparation stage, which includes the preparation and preparation of proposed research proposals and arranging permits for the research site. (2) The implementation stage, including documentation of the lesson plans and syllabus from six mathematics teachers. Then the results of the documentation are reviewed using CRMS. The results of the review CRMS will produce quantitative data in the form of a percent. Then the researcher prepares the research instrument and validated the instrument, this stage is carried out under the guidance of the guiding lecturer. After that, interviews were conducted with all six teachers to find out the teacher's response to the results of curriculum analysis of the field of mathematics using the CRMS. (3) the final stage, including the

analysis of all the data that has been available, conducts the preparation of research results and discussions.

How CRMS Work

CRMS can analyze the curriculum from primary education to higher education level. Because CRMS is web-based, these CRMS users can access CRMS from a mobile phone, tablet, or PC. CRMS can be accessed at http://www.untirtasoftware.com/crms/pages/index.php. The main way this CRMS works is to convert the curriculum data (lesson plan) into an XML-shaped LDMAP (Learning Design Map) first, and then the created LDMAP set is imported into CRMS. Then the LDMAP analysis data appears on the CRMS dashboard screen. The data from that analysis will be stored in CRMS as long as no CRMS user deletes the data.

To create an LDMAP, users can visit the CRMS website first, in the front view of the CRMS website, the user will be presented with a dashboard view. Users can click the 'Generate LDMAP File' button. This button can be found when the user is not logged in to the CRMS account and can also be found when the user has logged in to the CRMS account.

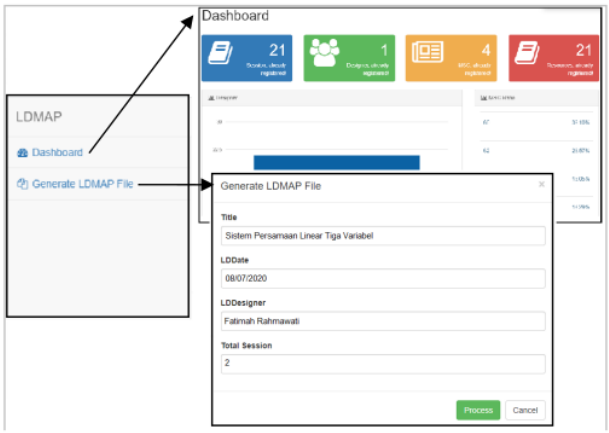

Figure 1. Dashboard and Generate LDMAP File Button
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on July 8th 2020 at 11:30 AM, UTC+07.00)

Users can fill in the Title, LDDate, LDDesigner, and Total Session fields available. The title column is filled with topic headings, LDDate is filled with the date, month, and year that LDMAP created, and the total session field is filled with the number of sessions to be created in a single LDMAP. Then click the 'Process' button. Then there will be another column that the user must fill in, as the below figure 2 showed. There are columns Duration, DIntroduction, DMain, DCompletion, RMain, RSupporting, RAdditional, TMain, TSupporting, TAdditional, SMain, SSupporting, SAdditional, Others, and MSC. The 'Duration' field is filled with the total duration of learning, the 'DIntroduction' field is filled with the prefix duration, the 'DMain' field is filled with the core duration, and the 'DCompletion' field is filled with the closing duration. The 'RMain' field is filled with the main resources used in learning, the 'RSupporting' field is filled with supporting resources that support main resources, and the 'RAdditional' field is filled with additional resources. The 'TMain' field is filled with main tasks used

in learning, the 'TSupporting' field is filled with supporting tasks that support the main tasks, and the 'TAdditional' field is filled with additional tasks. The 'SMain' field is filled with main support used in learning, the 'SSupporting' field is filled with supporting support that supports main support, and the 'SAdditional' field is filled with additional support. The 'Other' field is filled with additional information about learning, such as methods, models, and approaches used in learning. MSC or mathematical subject classification to classify the topics taught. There is 63 first-level classification starting from 00: General to 97: Mathematics Education (Fathurrohman, Porter, Worthy, Abdullah, Supriyanto & Pamungkas, 2019).

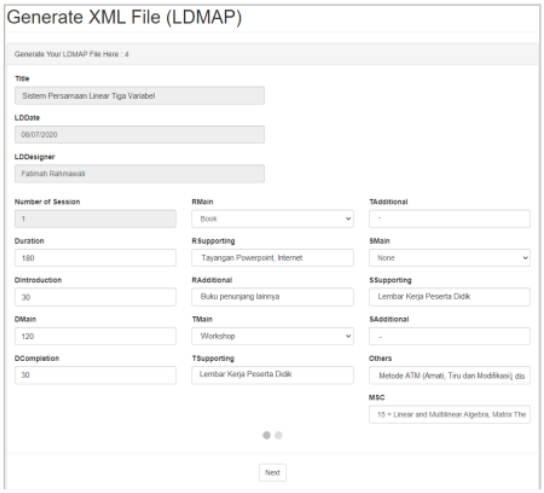

Figure 2. The Second Form of Generate LDMAP File Menu
(accessed at http://www.untirtasoftware.com/crms/pages/index.php?page=generate on July 8th at 11:41 PM, UTC+07.00)

When the user has filled in the entire column, the user can click the 'Generate' button then the LDMAP data will be automatically downloaded to the user's device. Users can create LDMAP according to the number of meetings held in the lesson plan, or the user can also create as many LDMAP as needed by the user to be analyzed.

Once all the required LDMAP is made, then the next step is to analyze it in CRMS. All you have to do is sign in first to your CRMS account. If the user is not already registered in CRMS or does not already have an account in CRMS, then the user can contact the CRMS creator first to create a username and password to log in to CRMS. Users can click the 'Login' button located in the upper-right corner of the CRMS dashboard. Then the user will be asked to enter the username and password to log in.

After logging in, the user will be displayed in the other main menu of CRMS, namely 'Import Data', 'Export Data', and 'Reset Data'. To analyze the LDMAP that has been created, the data stored in CRMS needs to be reset first so that the analysis results are will not mixed. Then the user can click the 'Import' button, to input the LDMAP from the user's device to the CRMS web. After the success of the input, the results of the analysis have appeared on the dashboard. If the user wants to download the analyzed file, the user can use the data export feature, which is a feature to download the analysis LDMAP results in the XML form.

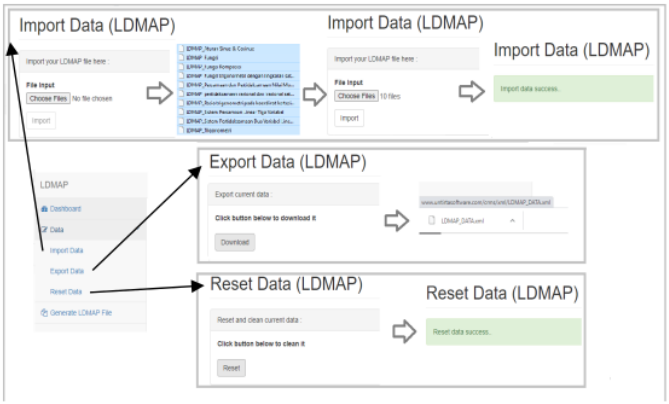

Figure 3. Some feature in CRMS when the user has logged in
(accessed at http://www.untirtasoftware/crms/pages/index.php on July 18th 2020 at 07:33 PM, UTC+07:00)

RESULTS AND DISCUSSION

After doing documentation, analysis stage in CRMS, and interview stage with teachers, here is an explanation about CRMS analysis results that analyze the compulsory mathematic lesson plan of grade X, XI, and XII Senior High School, and the conclusion of the interview results conducted to find out the teacher's response to these CRMS results.

Results of CRMS Analysis

CRMS analysis has six types of results: Subject information, Designer, MSC, Resources, Tasks, and Supports. It consists of subject information, five charts, and four percentages.

Subject information displays four information about the subject analyzed in CRMS. The information presented first is the number of sessions analyzed, the second is the number of designers who created LDMAP, the third is the number of resources studied. The designer diagram shows the designer and the number of LDMAP sessions analyzed by the LDMAP designer.

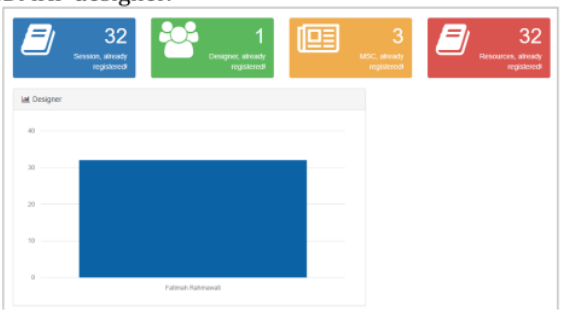

Figure 4. Subject Information and designer diagram of compulsory mathematics in grade X high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on July 6th 2020 at 12:27 AM, UTC+07:00)

Figure 4 shows the results of the analysis of the compulsory mathematics learning plan of grade X senior high school was that were 32 (thirty-two) LDMAP sessions analyzed, 1 (one) designer, 3 (three) MSC studied, and 32 (thirty-two) resources listed. This designer LDMAP is Fatimah Rahmawati whose analyzed as many as 32 (thirty-two) LDMAP sessions.

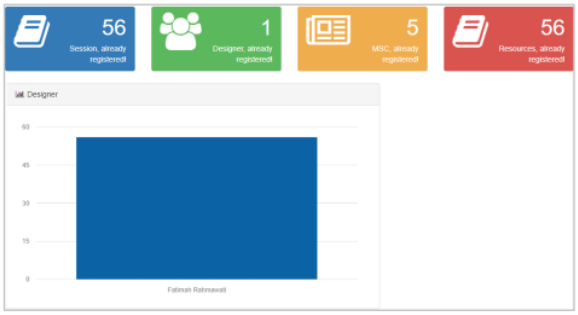

Figure 5. Subject information and designer diagram of compulsory mathematics in grade XI high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on September 1st 2020 at 3:43 PM, UTC+07:00)

Figure 5 shows the results of the analysis of the compulsory mathematics learning plan of grade XI senior high school was that were 56 (fifty-six) LDMAP sessions analyzed, 1 (one) designer, 5 (five) MSC studied, and 56 (fifty-six) resources listed. Figure 5 shows a designer named Fatimah Rahmawati who analyzed as many as 56 (fifty-six) LDMAP sessions.

Figure 6. Subject information and designer diagram of compulsory mathematics in grade XII high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on March 10th 2020 at 1:28 AM, UTC+07:00)

Figure 6 shows the results of the analysis of the compulsory mathematics learning plan of grade XII senior high school was that were 21 (twenty-one) LDMAP sessions analyzed, 1 (one) designer, 4 (four) MSC studied, and 21 (twenty-one) resources listed. The designer in figure 6 has been analyzed as many as 21 (twenty-one) LDMAP sessions.

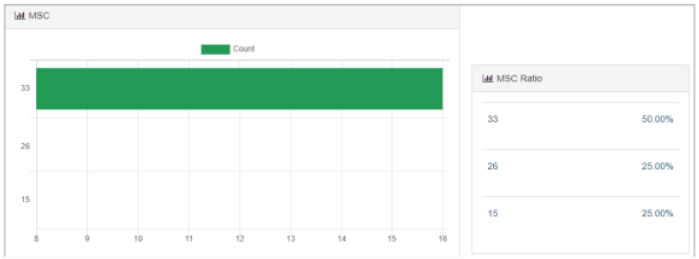

Figure 7. MSC diagram and MSC ratio of compulsory mathematics in grade X high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on July 6th 2020 at 12:27 AM, UTC+07:00)

MSC or Mathematical Subject Classification is a classification of mathematics topics taught in schools. Fathurrohman, Porter, Worthy, Abdullah, Supriyanto & Pamungkas (2019) said that the way MSC works is as follows, the mathematics-related literature is indexed by topic and then subsequently aligned with mathematical learning resources provided in the subject each week. In the results of grade X compulsory mathematics (shown in figure 7), these subject has three MSC namely number 33: Special function, 26: Real function, and 15: Linear and multilinear algebra: Matrix theory. Figure 7 above shows that the special function is most frequently studied, (having 50% or as many as sixteen meetings), the rest of the students learning real functions (having 25% or as many as eight meetings), and linear and multilinear algebra; matrix theory (has 25% or as many as eight meetings).

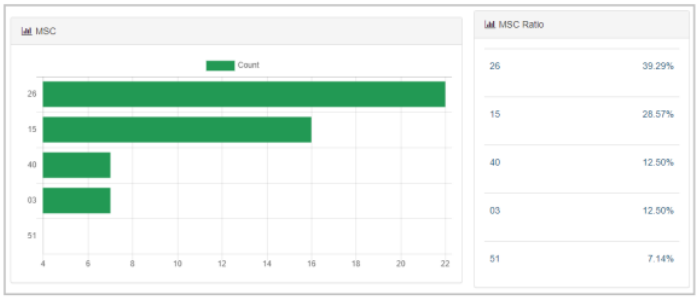

Figure 8. MSC digram and MSC ratio of compulsory mathematics in grade XI high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on September 1st 2020 at 3:43 PM, UTC+07:00)

The MSC diagram and MSC ratio of compulsory mathematics in grade XI high school that shows in figure 8, has five MSC studied. There are namely number 26: Real function, 15: Linear and multilinear algebra: Matrix theory, 40: Sequences, series, summability, 03: Mathematical logic and foundations, 51: Geometry. MSC number 26: Real function is most frequently studied (having 39.29% or as many as twenty-two meetings). In the second place, there is MSC number 15: Linear and multilinear algebra: Matrix theory, which has 28.57% or as many as six meetings. In the third and fourth place, there are MSC number 40: Sequences, series, summability; and number 03: Mathematical logic and foundations, both having 12.50% or as many as seven

meetings. The last one is MSC number 51: Geometry having 7.14% or as many as four meetings.

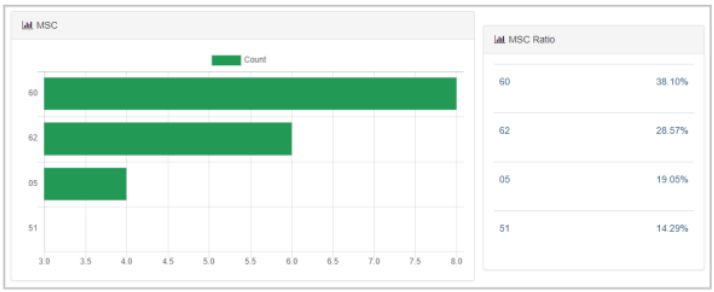

Figure 9. MSC diagram and MSC ratio of compulsory mathematics in grade XII high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on March 10th 2020 at 1:28 AM, UTC+07:00)

The MSC diagram and MSC ratio of compulsory mathematics in grade XII high school that shows in figure 9, has four MSC studied. There are namely MSC number 60: Probability theory, number 62: Statistic, number 05: Combinatorics, and number 51: Geometry. MSC number 60: Probability theory is most frequently studied (having 38.10% or as many as eight meetings). In the second place, there is MSC number 62: statistic, which has 28.57% or as many as six meetings. In the third place, there is MSC number 05: Combinatorics which has 19.05% or as many as four meetings. In the last place, there is MSC number 51: Geometry that has 14.29% or as many as three meetings.

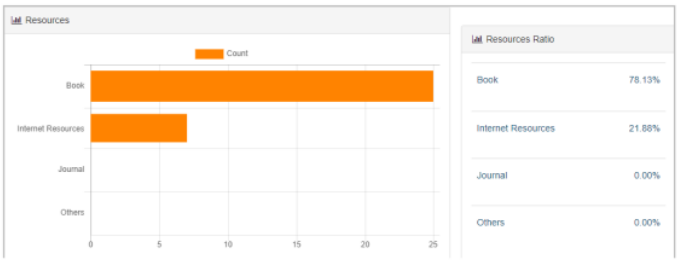

Figure 10. Resources diagram and resources ratio of compulsory mathematics in grade X high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on July 6th 2020 at 12:27 AM, UTC+07:00)

Resources show the main resources used in the learning process and also the number of sessions that use these main resources. Figure 10 shows that there are two types of resources used in this learning material, namely books and the internet. The most dominant books used by teachers were 78,13% or as many as twenty-five meetings. While the internet is used as much as 21,88% or as many as seven meetings.

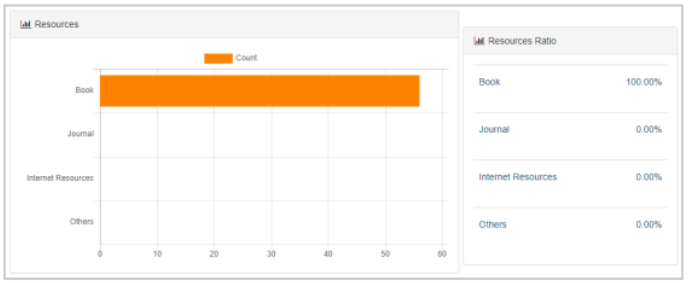

Figure 11. Resources diagram and resources ratio of compulsory mathematics in grade XI high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on September 1st 2020 at 3:43 PM, UTC+07:00)

Figure 11 shows that there is one type of resource used in this learning, namely books. Book is the most dominant used in this learning material. It was 100% or as many as fifty-six meetings the teacher used the book as the learning material.

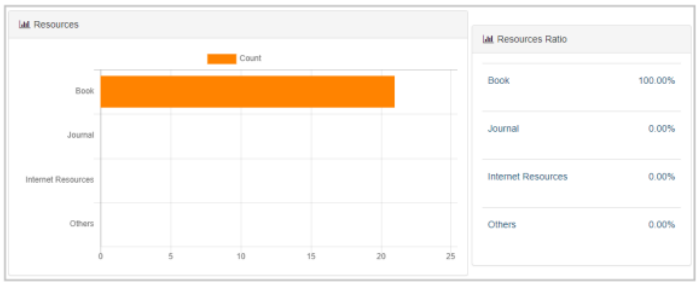

Figure 12. Resources diagram and resources ratio of compulsory mathematics in grade XII high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on March 10th 2020 at 1:29 AM, UTC+07:00)

Figure 12 shows that there is one type of resource used in this learning, namely books. Books used by teachers were 100% or as many as twenty-one meetings. It means the teacher using books as the main resources from the beginning until the end of the semester.

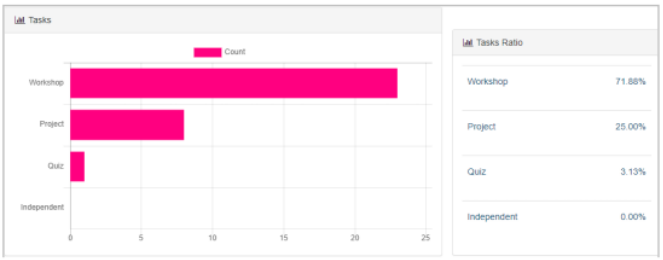

Figure 13. Tasks diagram and tasks ratio of compulsory mathematics in grade X high school

(accessed at http://www.untirtasoftware.com/crms/pages/index.php on July 6th 2020 at 12:27 AM, UTC+07:00)

Tasks display the main tasks that the teacher assigns to his students and the number of meetings of each of them. Figure 13 shows that there are three tasks performed by students, namely workshops (71,88% or as many as twenty-three sessions), projects (25% or as many as 8 sessions), and quizzes (3,13% or as many as one sessions).

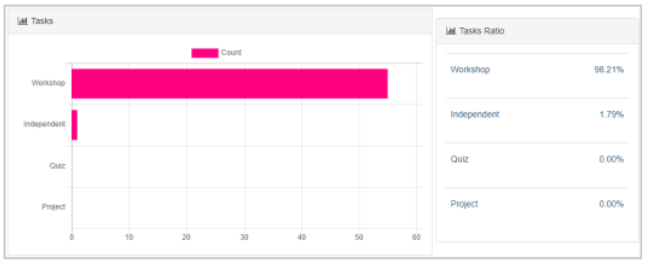

Figure 14. Tasks diagram and tasks ratio of compulsory mathematics in grade XI high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on September 1st 2020 at 3:43 PM, UTC+07:00)

Figure 14 shows that there are two tasks performed by students, namely workshop and independent. The workshops were 98.21% or as many as fifty-five meetings. Independent were has 1.79% or as many as one meeting.

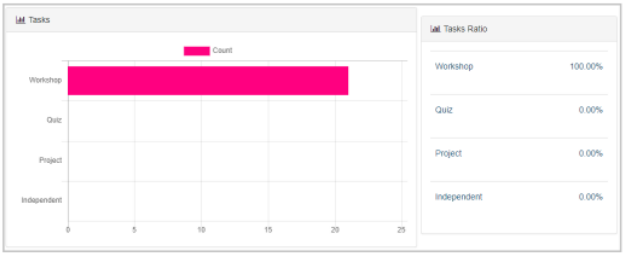

Figure 15. Tasks digram and tasks ratio of compulsory mathematics in grade XII high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on March 10th 2020 at 1:29 AM, UTC+07:00)

Figure 15 shows that there is one task performed by students, namely workshop. The workshops that were used in the learning activities were 100% or as many as twenty-one meetings.

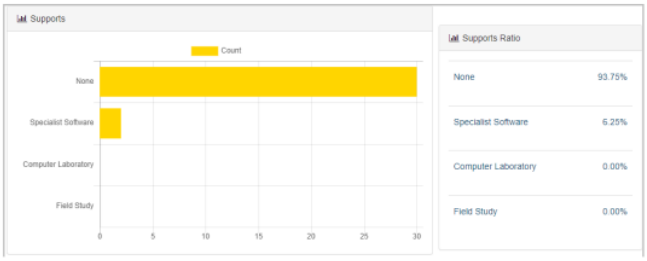

Figure 16. Supports diagram and supports ratio of compulsory mathematics in grade X high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on July 6th 2020 at 12:28 AM, UTC+07:00)

Supports display the main support that is always used during the learning activities and also the number of meetings from each of them. Figure 16 shows that teachers used the main support in the form of specialist software as much as 6,25% or at two meetings. The rest of the teachers did not use the main support at all (93,75% of for thirty sessions).

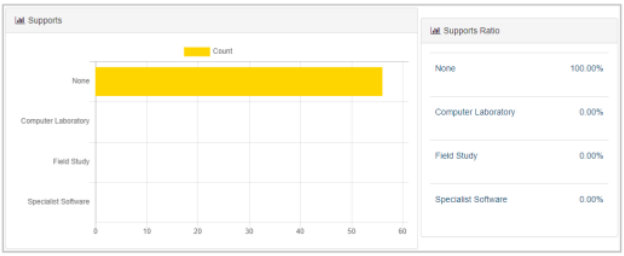

Figure 17. Supports diagram and supports ratio of compulsory mathematics in grade XI high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on September 1st 2020 at 3:44 PM, UTC+07:00)

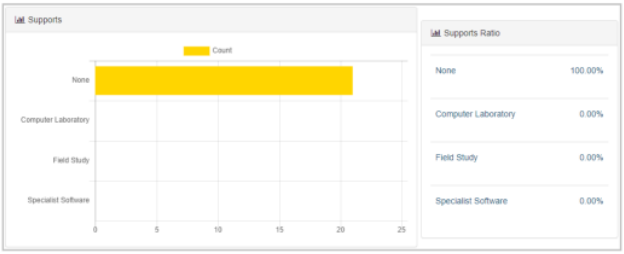

Figure 18. Supports diagram and supports ratio of compulsory mathematics in grade XII high school
(accessed at http://www.untirtasoftware.com/crms/pages/index.php on March 10th 2020 at 1:29 AM, UTC+07:00)

Figure 17 shows that teachers did not use the main support at all (100% of for fifty-six sessions). Teachers did not use any main support such as computer laboratory, field study, or specialist software. Figure 18 shows that teachers did not use the main support at all (100% of for twenty-one sessions).

Teacher Interviews

The compulsory mathematics teacher in grade X was initialized as G1. The specialization mathematics teacher in grade X was initialized as G2. The compulsory mathematics teacher in grade XI was initialized as G3. The specialization mathematics teacher in grade XI was initialized as G4. The compulsory mathematics teacher in grade XII was initialized as G5. The specialization mathematics teacher in grade XII was initialized as G6.

A total of four teachers, namely G3, G4, G5, and G6 said that the results of this CRMS analysis are effective. A total of three teachers, namely G4, G5, and G6 said that the results of this CRMS analysis are efficient and clear. A total of four teachers namely G1, G2, G3, and G5 agreed that the height and low of diagrams in the CRMS analysis results were influenced by many factors, namely factors related to each MSC diagram, resources, tasks, and supports. The factors that cause the height and low of the MSC diagram are the factors of the variety of materials taught. Factors related to the resources diagram are the influence of what primary learning resources teachers used in the learning process. Factor related to the tasks diagram is the influence of what the main tasks are done by students in the learning process. The factor associated with the supports diagram is the influence of what primary support teachers use in the learning process. The other two teachers, G4 and G6, agreed with some of the statements given. G4 agreed with the statement that the supports diagram is influenced by the primary supports used by teachers in the learning process. Meanwhile, G6 agreed with the statement that the tasks diagram is influenced by what the main tasks are done by students in the learning process.

All teachers agreed that the results of this CRMS can be useful for teachers in reviewing lesson plans, as preparation for teachers to present learning and can also be used as a lesson plan reflection tool for teachers, teachers can reflect on their lesson plans before being used to present learning. CRMS can facilitate teachers to analyze teacher lesson plans. In CRMS results are listed subject information, designer diagrams, diagrams and ratio MSC, resources, tasks, and support. Teachers can see how many learning activity meetings will be conducted, what materials will be taught, what learning activities will be done, what tasks will be given to students, and what support will be used during the learning. That way CRMS helps teachers in observing/reanalyzing their lesson plans, then teachers can revise their lesson plans again to make their lesson plans even better in doing learning or presenting learning in the classroom. It can also be called by the teacher reflecting the lesson plan that has been created, by analyzing the lesson plan first in CRMS, then will come out the results of the analysis, then teachers revised again the lesson plans if the teacher feels there is something lacking in the lesson plan. At the end of the interview stage, all of the teachers said that they may use CRMS as a tool to analyze the mathematics curriculum.

Discussion

CRMS can be used to review and map the curriculum, especially the math curriculum. CRMS works by collaborating using LDMAP or learning design map. LDMAP is an intermediary between teacher lesson plans and CRMS. The essence of the teacher's lesson plan is input into LDMAP, then the LDMAP collection is analyzed in CRMS. This is also stated by Fathurrohman, Porter, Worthy, Abdullah, Supriyanto & Pamungkas (2019), who in their paper conclusion stated that the available learning design maps can be further advanced for use in curriculum review.

CRMS results in four subject information boxes, one designer diagram, one MSC chart and one percentage ratio from MSC, one resources chart and one percentage ratio from resources, one tasks chart and one percentage ratio from tasks, and the last is one support chart and one percentage ratio from supports

From the results of the analysis of compulsory mathematics lesson plan class X senior high school by CRMS obtained the most used main resources in learning is books, the rest is internet resources. From these results, teachers have been good at applying variations in their learning resources. The main tasks that are mostly done by students are workshops, then followed by projects, and quizzes. In this case, the teacher has been good at giving tasks to students, because the tasks chosen vary. To play supports, teachers use special software. That's good because it will help students in learning, but maybe teachers can increase their intensity by teaching using specialist software in other materials.

From the results of analysis of compulsory math lesson plans grade XI senior high school by CRMS, obtained the most used main resources in this learning is a book. From these results, teachers may be able to add new resources in the form of journaling, internet access, or others. The main tasks that are mostly done by students are workshops, the rest are independent. From these results, it has been good in choosing two different types of tasks, but teachers may be able to add the number of tasks given so that the balance is not too dominant in the workshop or teachers can add more variations of tasks given to students, such as quiz or project. For the main support diagram, it appears that the teacher does not use main support for the support category listed in this CRMS. For advice, teachers can use main supports to support learning such as computer laboratory, field study, or specialist software.

From the analysis of compulsory mathematics lesson plans, class XII senior high school by CRMS obtained the most used main resource books. From these results, teachers may be able to add new resources in the form of journaling, internet access, or others. The main tasks that are mostly done by students are workshops. From these results, teachers may be able to add other variations of tasks for students to work on such as independent, project, or quiz. For the main support diagram, it appears that the teacher does not use main support for the support category listed in this CRMS. for advice, teachers can use main support to support learning such as computer laboratory, field study, or specialist software.

From the explanation before, we can take the point is by analyzing the lesson plan using CRMS, teachers can become more developed the learning that teacher has made before again before the learning process begins. Learning components such as resources, tasks, supports can be further varied. This is in line with the opinion Goldsmith, Doerr, & Lewis (2014) reviewed 106 refereed articles written on the professional learning of practicing mathematics teachers and suggested the effective professional development should cover some components, one of which is changes in teachers instructional practices which included changes in mathematics content covered in teachers lessons, changes in the way discussions are carried out, and promoting students intellectual autonomy. In addition according to Sealey & Noyes (2010) concluded that mathematics should be presented in some context, be purposeful and enable all students to acquire the awareness of the important role of mathematics in society.

From the interviews conducted with as many as 6 teachers, there are as many as 4 teachers who agree that the CRMS results are effective. A total of 3 teachers also agreed that the results of CRMS analysis are efficient and clear. In addition, teachers

agree that CRMS can be used by teachers as a tool to analyze teacher lesson plans. This is in line with the opinion of Muttaqin, Rahmawati, Fathurrohman & Santosa (2020) who in conclusion stated that the use of CRMS is easy for mathematics teachers so that it can help mathematics teachers in analyzing curriculum and lesson plan. Teachers also agree CRMS results can also be used as a lesson plan reflection tool for teachers, or as a preparation for teachers to present learning. It is also stated by Fathurrohman, Porter, Worthy, Abdullah, Supriyanto & Pamungkas (2019) which suggests that automatic reporting of curriculum review results, in particular, aggregate information classification of current mathematics subject and the quality of graduates can then be used in institutional self-reflection.

CONCLUSION

CRMS can be used using mapping system technology. CRMS uses LDMAP or Learning Design Map folders to analyze curriculum data in the form of lesson plans that have been transferred into LDMAP. The results of the national curriculum analysis of the field of mathematics using CRMS have a diversity of results, already explained in more detail in the previous discussion. The results of this CRMS analysis can be useful for teachers in reviewing lesson plans. CRMS can also be used as a reflection tool for teacher lesson plan as preparation for teachers before the teacher presents their learning in the classroom.

ACKNOWLEDGMENTS

This research is a research development of Curriculum Review Mapping System (Fathurrohman, Porter, Worthy, Abdullah, Supriyanto & Pamungkas, 2019), and Curriculum Review Mapping System (CRMS) funded by Research Grant Number: B/03/UN43.9/PT.00.03/2020

REFERENCES

Ernawati, & Safitri, R. (2017). Analisis Kesulitan Guru Dalam Merancang Rencana Pelaksanaan Pembelajaran Mata Pelajaran Fisika Berdasarkan Kurikulum 2013 Di Kota Banda Aceh. *Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education)*, *5*(2), 49–56. https://doi.org/10.24815/jpsi.v5i2.9817

Fathurrohman, M., Porter, A. L., Worthy, A. L., Abdullah, R., Supriyanto, & Pamungkas, A. S. (2019). Mathematics Curriculum Review by Advancing the Use of Learning Design Map and Subjects Classification. *International Journal on Emerging Mathematics Education*, *3*(1), 27–40.

Goldsmith, L. T., Doerr, H. M., & Lewis, C. C. (2014). Mathematics teachers ' learning : a conceptual framework and synthesis of research. *Journal of Mathematics Teachers Education*, *17*(1), 5–36. https://doi.org/10.1007/s10857-013-9245-4

Gravemeijer, K., Stephan, M., Julie, C., Lin, F., & Ohtani, M. (2017). What Mathematics Education May Prepare Students for the Society of the Future ? *International Journal of Science and Math Education*, *15*(1), 105–123. https://doi.org/10.1007/s10763-017-9814-6

Haslina, Yusrizal, & Usman, N. (2017). Kinerja Guru Dalam Implementasi Kurikulum 2013 Pada SMA Negeri 5 Lhokseumawe. *Jurnal Magister Administrasi Pendidikan Pascasarjana Universitas Syiah Kuala*, *5*(4), 211–217.

Hikmawati, F. (2017). *Metodologi Penelitian* (1st ed.). Depok: PT RajaGrafindo Persada.

Ikhsan, K. N., & Hadi, S. (2018). Implementasi Dan Pengembangan Kurikulum 2013. *Jurnal Ilmiah Edukasi*, *6*(1), 193–202.

Kusmaryono, I. (2014). The Importance of Mathematical Power in Mathematics Learning. *International Conference on Mathematics, Science, and Education 2014*, (September 2014), 35–40. Semarang.

Lee, P. Y. (2010). Designing a mathematics curriculum. *Journal on Mathematics Education*, *1*(1), 1–10.

Muttaqin, I. H., Rahmawati, F., Fathurrohman, M., & Santosa, C. A. H. F. (2020). Mathematics Curriculum Review In Junior Secondary School Level : Implementation Of Web-Based CRMS. *International Journal on Emerging Mathematics Education*, *4*(2), 95–104. https://doi.org/http://dx.doi.org/10.12928/ijeme.v4i2.16711 Mathematics

Palobo, M., Sianturi, M., Marlissa, I., Purwanty, R., Dadi, O., & Nur, A. S. (2018). Analysis of Teachers ' Difficulties on Developing Curriculum 2013 Lesson Plans. *1 St International Conference on Social Sciences (ICSS 2018)*, *226*, 1319–1324. https://doi.org/https://doi.org/10.2991/icss-18.2018.278

Republik Indonesia. (2003). *Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional*. Jakarta.

Republik Indonesia. (2016). *Peraturan Menteri Pendidikan dan Kebudayaan Nomor 22 Tahun 2016 Tentang Standar Proses Pendidikan Dasar dan Menengah*. Jakarta.

Rifai, N., Fauzan, Wahdi, S., & Bahrissalim. (2014). Integrasi Keilmuan Dalam Pengembangan Kurikulum Di UIN Se-Indonesia. *Tarbiya*, *1*(1), 13–34.

Santi, D., Sugiarti, T., & K, A. I. (2015). Pengembangan Perangkat Pembelajaran Matematika Realistik Pada Pokok Bahasan Lingkaran Kelas VIII SMP. *Kadikma*, *6*(1), 85–94.

Sealey, P., & Noyes, A. (2010). On the relevance of the mathematics curriculum to young people. *The Curriculum Journal*, *21*(September 2010), 239–253. https://doi.org/10.1080/09585176.2010.504573

Setiadi, H. (2016). Pelaksanaan Penilaian Pada Kurikulum 2013. *Jurnal Penelitian Dan Evaluasi Pendidikan*, *20*(2), 166–178. https://doi.org/http://dx.doi.org/10.21831/pep.v20i2.7173

Sugiyono. (2013). *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D)* (18th ed.). Bandung: Alfabeta.

Sukmadinata, N. S. (2005). *Metode Penelitian Pendidikan*. Bandung: PT Remaja Rosdakarya.

Wulandari, E. (2019). Profil Kemampuan Menyusun Rencana Pelaksanaan Pembelajaran Saintifik Oleh Calon Guru Matematika. *Jurnal Pengembangan Pembelajaran Matematika (JPPM)*, *I*(2), 30–37.

CRMS

ORIGINALITY REPORT

17%	15%	11%	8%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

2%

★ curis.ku.dk

Internet Source

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	Off		