Development of Mind Mapping as Media for Student Career Planning
Case Study at SMKN – 2 Godean, Yogyakarta

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ABSTRACT
This study aimed at developing appropriate and effective mind mapping media for students' career planning. The type of research used is Research and Development utilizing ADDIE design. The samples of this study were 10 students of tenth grade SMKN – 2 Godean, Yogyakarta with certain considerations (purposive sampling). The data analysis techniques used in this study were percentage and gain score. The results show that mind mapping media is very suitable to use, which can be seen from the average value of material and media expert tests showing very appropriate category. Furthermore, the gain score shows that mind mapping media is quite effective to help students' career planning. Hence, it can be concluded that mind mapping media is very appropriate and quite effective to help students' career planning.

Keywords: *Mind Mapping, Media, Student Career Planning, SMKN 2 Godean*

1. INTRODUCTION

According to Yusuf, career guidance is a process of guidance which can help a person to develop, solve, and plan for their career matters, including the understanding to the position and duties of a job, understanding to a condition and self-ability, understanding to some of environmental conditions, planning, and developing a career, adjustments in work, and solving career problems experienced [1]. Career balances are required to help vocational students when planning their career plans. Career, by definition, is a person's life experience in one or more of the entire professions. Specifically, it refers to a person by virtue of their work from the beginning to obtain legal income and no longer rely on labour income made up the life course [2]. Meanwhile, career planning refers to the combination of individuals and organizations, making analysis and weigh on their own interests, hobbies, abilities, specialties, experiences and inadequate based on the study of the determination, analysis, summary on the subjective and objective conditions of a person's career, integrating era peculiarities at the same time, according to their own career tendency, it can be determining the best career goals for them, and make the effective arrangements to achieve this goal in the end [3].

In the book on operational guidance in the implementation of guidance and counselling in Vocational High Schools in 2016, the developmental tasks of students related to career planning preparation are described, namely (1) Increasing insight and expertise in accordance with the desire to follow and continue lessons and/or prepare a career and function in community life. (2) Understanding the skills, abilities, interests, and direction of career leaning and appreciation of the arts. By developing knowledge, skills and knowing their potential, students are expected to be able to make an established career plan for the future [4]. The value of career planning lies in the clarity of personal vision, understanding oneself effectively, understanding the environment and resources needed, and using and managing them fairly. [5]. According to Sukardi & Sumiati, there are also some benefits for someone who has career programming, they can get decision-making planning skill, increasing self-confidence, creating meaning for today's activities, understanding various opportunities, recognizing plans that must be tried, and preparing life plans [6].

However, the reality is there are still problems found related to career planning for vocational students. From the perspectives of students, they cannot evaluate themselves properly to set up their career goals. For example, they are either too self-confident or

underestimate their own capabilities. Furthermore, they cannot evaluate their job opportunities properly. For instance, they may be uncertain about their choices, because they are affected by some external factors; they cannot match themselves with the professional requirements [7].

Career planning problems that occur in students are generally related to the type of education choice that leads to the type of work preference in the future [8]. Students' problems related to career planning are caused by a lack of self-understanding, parents do not give them a freedom in choosing a career, as well as the choice of making friends with, lack of self-confidence, and lack of self-motivation as a supporter in establishing career choices [9]. Then, according to Atmaja, lack of concern for career planning, and the option on the basis of following friends if they remain silent, it will cause negative consequences. The negative consequences are, the determination of further studies in the original way, and the determination of activities that are not according to talent, and not seeing the expertise in people will lead to failure in a career [10].

The problems of career planning found in students at SMKN - 2 Godean, Yogyakarta are; (1) the lack of interest of students in following career guidance due to a lack of their understanding about the importance to develop career planning from an early age. Students think that it is not yet time to decide on career planning, career planning can be done in class XII. (2) There are students who are interested in further study in higher education but still do not know more in-depth information about the higher education they are aiming for, such as the importance of accreditation, graduate prospects and what requirements are needed to enter higher education. (3) There are students who still having a lack information about the work skills needed in the community, especially in the work skills needed during the current 4.0 industrial revolution. This really needs to be guided in an effort to explore various job skills information needed, especially in the era of the industrial revolution 4.0 which is increasingly sophisticated in the use of technology and the internet in work productivity. Therefore, teachers should be partners, directors, assistant, sponsor and instructors who can support and give the understandings for students [11].

So, it is necessary for every Guidance and Counselling teacher to be able to guide students. Therefore, to implementing a career planning guidance with this verbal and nonverbal communication, Guidance and Counselling teachers need a media to be able to provide various career information related to themselves, work information, and tips on how to choose a career. The media used must be provided to all students, not limited to a few students. The media that can be used to convey various career information is mind mapping media. The information contained in mind mapping media can help in planning an activity and solving various problems [12]. Through mind mapping media, students are invited to creatively see various information on their potential, opportunities, and obstacles that will be faced in the future. The advantage of using mind mapping media is that it is more effective because it does not require a long duration to learn. A lot of information is arranged briefly with curved lines that resemble human nerves by combining various colours, and images in order to attract the attention and motivation of students to learn what is contained in the mind mapping media [13].

The application of group guidance based on an effective mind map can improve students' career planning. Through the mind map method, students are invited to think broadly to get self-information and career information [14]. Mind mapping has a positive influence on career path planning. Through mind mapping media students receive a lot of career information contained in the media [15]. These studies are needed to assist students in developing career planning. So that further research is necessary to develop mind mapping as a feasible and effective medium to assist student career planning at SMKN – 2 Godean, Yogykarta.

2. METHODOLOGY

This study uses the research & development or R&D method using the ADDIE design model developed by Branch which includes analyse, design, development, implementation, and evaluation. The ADDIE design model is very suitable for the development of guidance and counselling service designs. The steps for developing ADDIE design products are analyse, the first stage that relates to analytical activities to the atmosphere of the activity and the area so that it can be found what products need to be developed. The second stage is design, is a research design activity and product design in accordance with the needs found in the field. The third stage, development, is product development activities in the form of making and testing a product. The fourth stage, namely implementation, is in the form of activities using the product and practiced in the field. The fifth stage is evaluation products that lack usefulness values are reassessed whether in the manufacture and preparation of products they have followed the previous steps [16].

This study used a sample of students in class X at SMKN–2 Godean, Yogykarta with certain considerations (purposive sampling). The results of the study on 10 students can be applied to the population with the condition that the population experiences the same problem, namely problems in career planning. The instruments used are career planning inventory instruments, material expert test instruments, and media expert test instruments. Analysis of research data is descriptive quantitative.

3. RESULT

3.1. Analisis Stage

Furthermore, the researchers carried out the stages of analysing the needs in the field and looking for alternative solutions to these problems. Next, the researchers conducted an interview with the Guidance and Counselling teacher and gave a questionnaire to the students. Interviews with Guidance and Counselling teachers obtained information about (1) Guidance and Counselling teachers do not have class entry service hours so that services are maximized outside of class hours. (2) Guidance and Counselling teachers have carried out career guidance outside class hours, but most of the applicants are students of class XII. (3) Guidance and counselling teachers already have media as a means for providing career guidance services, but these media need to be maximized and need to be renewed.

Then carried out extracting information on students who are in SMK Negeri 2 Godean. Researchers distributed questionnaires to students to find out their needs and obtained 19.6% low, 59.8% moderate, and 20.6% high in career planning. The results of the questionnaire were strengthened by the results of the need assessment by previous Guidance and Counselling teachers for students in the career field; (1) Students need information on available scholarship opportunities. (2) Students need a way to organize activities between study and work. (3) Students need a way to choose extracurricular activities that interest each student. (4) Students need to strengthen the selection of specializations that have been taken. (5) Students need to understand their talents for future careers. (6) Students need to master the meaning of career planning, steps to design a career and have positive actions to achieve future success.

Based on the results of interviews and need assessments, it can be concluded that students need assistance in career planning so that Guidance and Counselling teacher guidance is needed with tools, namely media. Mind mapping media is a tool that can assist students in obtaining career information. Through mind mapping media, a lot of career information can be summarized into the media.

3.2. Design Stage

Furthermore, at the design stage, the researcher chose a development concept to do, namely the development of mind mapping media equipped with a user manual. Before designing mind mapping media, researchers need to compile career planning materials contained in the manual. Career planning material as the basis for preparing mind mapping media.

The size of the manual is 14.8 x 21 cm with the title "guidelines for using mind mapping media for student career planning in SMK". The material includes career planning, self-knowledge, career exploration, and choosing a career. Career planning is a life process that goes through 3 phases, namely knowing oneself, exploring options, and deciding which choices to make in a dynamic and diverse environment [17].

3.3. Development Stage

After compiling the materials and user manual, the next step is the development of mind mapping media which includes determining the size of the mind mapping media, designing layout colours, determining the main topic, determining branch topics and connecting with the main topic using coloured curved lines, including the campus logo and the identity of the researcher.

Mind mapping media is designed with a size of 114 x 60 cm totalling 3 pieces, each of which discusses the main topics of knowing one self, career exploration, and choosing a career. Each media layout is blue, grey, and navy blue. The main sub-topic "knowing yourself" includes material interests, talents, hobbies, character, achievements and intelligence. The main sub-topic “career exploration” includes skills, income, type of work, and type of college. The main sub-topic “choose a career” includes goals, direction, support, and planning activities. Furthermore, the researchers included the campus logo and the identity of the researcher on the three mind mapping media so that if there were teachers who had difficulties or were indecisive in using mind mapping media, they could contact the campus or researchers directly.

Table 1. Product Eligibility Categorization Guidelines

NO	Score Range	Category
1.	76 - 100	Very Worthy
2.	51 - 75	Worthy
3.	26 - 50	Worthy enough
4.	< 26	Less Worthy

After the mind mapping media has been designed, the material and media will be validated by expert examiners. Validation of the material is carried out by lecturers who are material experts, especially lecturers who are experts in career planning materials, in this case Dr. Agus Basuki, M.Pd. Guidelines for categorizing the feasibility of mind mapping media using table 1 [18]. The results of the validation of the material can be seen in table 2. The results of the validation of the material state that the mean value of the material feasibility is 95.5, including the very feasible category in terms of benefit standards, feasibility standards, property standards and accuracy standards.

Standard of benefit is that the material developed has a useful value to increase students' knowledge. The material presented is able to arouse students' interest in learning, and arouse student activity in learning activities. Eligibility standards, namely the material developed is considered appropriate to be given to students without containing hate speech and elements of racist. Property standards, namely the material presented is combined with the tools and materials used are safe and do not endanger students and the material provided can represent all the information that will be conveyed. Accuracy standards, namely the material developed is given to students according to their age so that the information conveyed in the media is right on target and easily understood by students [19].

Table 2. Material Validation Results

No	Aspect	Rating Points	Score
1.	Benefit	The material presented in the media has a useful value for students	3
2.		Students have a new knowledge after reading the material	4
3.		Students have new skills after studying the material presented in the media	4
4.		The material presented is not excessive	4
5.		The material in the media does not mislead students' knowledge	4
6.	Worthiness	The material presented stimulates the attention of students	3
7.		The material presented stimulates students' interest in learning	3
8.		The material submitted does not contain hate speech	4
9.		The material presented does not contain elements of racist	4
10.		The material uploaded students to read	3
11.	Property	The material is easy to be understood	4
12.		The material is easy to be learned	3
13.		The word choice is very appropriate for students	4
14.		The material represents all career information that will be conveyed	4
15.		The materials motivate students to learn	3
16.	Accuracy	The material is in accordance with learning needs	4
17.		The material is in accordance with the learning activity plan	4
18.		The material is in accordance with the learning activity program	4
19.		The material is in accordance with the learning objectives	4
20.		The material is in accordance with the characteristics of students	4
		Total Score	74
		Grade = (F/N) x 100	95,5

After the validation of the material has been completed, the next step is media validation. The media expert test in this case is Dr. Ali Muhtadi, M.Pd which was held on March 8, 2021 to April 01, 2021. Media validation was carried out based on aspects of relevance, attractiveness, and benefits with answer choices including very appropriate, appropriate, inappropriate, and very inappropriate. The results of the validation of the media can be seen in table 3 as follows

Table 3. Media Validation Results

No	Aspect	Rating Points	Score
1.	Relevance	The media used is in accordance with the material will be delivered	3

2.		The media used is in accordance with the characteristics of the students	3
3.		The media used is in accordance with the needs of students	3
4.		The media used is in accordance with the learning objectives	2
5.		Material selection for media is not harmful to students	4
6.	Easiness	The media is easy to use	3
7.		The media is easy to be learned	3
8.		Affordable media production materials and tools	4
9.	Attractiveness	The media stimulates the attention of students in terms of display selection	4
10.		The media stimulates the attention of students in terms of image selection	4
11.		The media stimulates the attention of students in terms of color selection	4
12.		Media attracts students' interest to read	4
13.	Benefit	Media brings useful values for students	3
14.		Media has value for students	3
15.		Media motivates students to learn	3
		Score	9
		Total Score	47
		Grade= (F/N) x 100)	**78,33**

Based on table 3, it can be seen that the media validation value score is 78.83 including the very feasible category in terms of relevance, convenience, and benefits. Media development needs to pay attention to aspects, namely (1) suitability or relevance, meaning that learning media must match the desire to learn, the concept of learning activities, learning activity programs, learning objectives, and the character of teaching participants (suitable for learning). with the student's degree of thinking). (2) The aspect of convenience, meaning that all learning content through media must be easy to understand, learn, or be understood by teaching participants and very operational in its use. (3) The attractiveness aspect, meaning that the learning media must be able to attract or trigger the attention of teaching participants, both appearance, colour options, or content. The explanation of the content is not overwhelming and can arouse the attention of the teaching participants to use the media. (4) The benefit aspect means that the content of the learning media must be valuable or useful, has benefits for the description of learning materials and is not in vain or useless, especially disturbing the teaching participants [20].

Material and media validation has been carried out, so the next step is field trials to determine the feasibility in terms of practicality in using mind mapping media. The field trial was limited to 8 students of SMK Negeri 2 Godean. The following table shows the results of the practicality test of using mind mapping media.

Table 3. The Result of Practicality Test Using Mind Mapping Media

Student	Per Aspect Value			Final score
	Appearance	Language	Benefit	
1	88	75	66	83
2	84	75	72	78
3	66	79	72	79
4	66	75	66	75
5	72	88	72	84
6	66	75	69	76
7	69	75	69	78
8	72	92	75	86
Average	72,66	79,17	69,92	79,69

The average value of the practicality test is 79.69 which is included in the appropriate category from the aspect of appearance (72.66), language aspect (79.17), and aspect of benefit (69.92).

Based on the value obtained from material validation (95.6), media validation (78.33), and practicality test (79.69) it can be concluded that mind mapping media is feasible to use.

3.4. Implementation Stage

In the implementation stage, the researcher tested the effectiveness of mind mapping media. The mind mapping media effectiveness test involved 10 students in group guidance services which were divided into 5 sessions, namely pretest, first treatment, second treatment, third treatment and posttest. The data obtained from the pretest and posttest results can be seen in table 5. The mean pretest value of 10 students, which is 72.73, is included in the low category in career planning. Furthermore, students are given treatment, namely providing career planning information through mind mapping media. After the treatment, the students were given a posttest so that the average score was 82.27 which was included in the medium category, which means that students experienced an increase and were good at career planning.

Table 4. Pretest & Posttest Result Data

NO	Student	Pretest	Category	Posttest	Category
1	Student 1	73	Low	84	Medium
2	Student 2	73	Low	76	Medium
3	Student 3	75	Low	89	High
4	Student 4	73	Low	80	Medium
5	Student 5	72	Low	83	Medium
6	Student 6	70	Low	76	Medium
7	Student 7	75	Low	92	High
8	Student 8	73	Low	77	Medium
9	Student 9	67	Low	88	Medium
10	Student 10	75	Low	78	Medium
Average		72,73	Low	82,27	Medium
Max Grade		75		92	
Min Grade		67		76	

$$<gain>= \frac{\text{Posttest Score} - \text{Pretest Score}}{\text{Maximum Score} - \text{Pretest Score}}$$

$$= \frac{82{,}27 - 72{,}73}{100 - 72{,}73}$$

$$= \frac{9{,}54}{27{,}27} = 0{,}35$$

Then the pretest and posttest data were analyzed using the gain score formula with an acquisition score of 0.35 and interpreted using a category 6 table categorizing the effectiveness of mind mapping media according to Hake which has been modified Sundayana is included in the medium category, meaning that mind mapping media quite effective to be used to help students in planning career planning [21].

Tabel 5. Categorization of the Effectiveness of Mind Mapping Media

Grade	Category
-1,00 ≤ g < 0,00	Decrease
G = 0	Stable
0,00 < g < 0,30	Low
0,30 ≤ g < 0,70	Medium
0,70 ≤ g ≤ 1,00	High

3.5. Evaluation Stage

Furthermore, at this stage, product improvements are carried out both in terms of material and in terms of media components. Suggestions from the material validator are used to improve the media. As for suggestions from the validator, namely the illustration of the image, the source should be included and not too dense, both images and materials. Researchers make improvements to the material on the basis of these suggestions.

Then in terms of media, improvements were made on the basis of the validator's suggestions, namely (1) the content of the material on the twigs should be details of the branches, and (2) in the media that was made there were still many branches whose material was equivalent to twigs, so that mind mapping readers could misinterpret it. So that improvements are made to the media.

Suggestions from material validators and media validators as a basis for making improvements and perfecting mind mapping media for student career planning.

4. DISCUSSION

Media has a positive influence on students in the learning process [22]. It can point out the messages, stimulate thoughts, feelings, attention, and encourage one's ability to teach and learn [23]. According to Aththibby & Salim the learning media makes it easier for teachers to provide and present material in the teaching and learning activities, therefore, students can more easily understand and understand the material provided by the teacher [24]. One of these media is mind mapping media.

Buzan explained that media is an easy way to enter information into the brain and convey information that has been stored back [25]. Mind mapping media are arranged using words, colors, lines, symbols and images that are used to make the information received easily[26]. The human brain can remember images much better than only words [27]. In addition, the combination of colors, lines, symbols, and images stimulates the attention of the brain to make more easily understand the information contained in the media [28].

The use of mind mapping media is able to encourage students to think synergistically, sharpen memory and carry out imagination through associations [29]. Mind mapping media also encourages students' interaction and freedom to express their own creative thinking and thereby improve their learning achievement [27].

Mind mapping media can be used in various phases of the service and teaching process in order to motivate students, improve a plan, practice thinking, gain new knowledge and train systematic thinking skills. [30] [31] Mind mapping media can open up the potential of the whole brain system and form creativity, responsibility, honest characters, respect for others, and think critically as well as assist in decision making and find a more balanced approach to overcome the problems especially in preparing student career plans [32] [33] [15]. Career information that needs to be conveyed through mind mapping media can be utilized in the form of self-understanding of abilities and attention, career information, making realistic decisions, planning skills for the future, positive character in the world of work[34].

Then, the presentation of the topic of information in mind mapping media should be as attractive as possible so students will be interested to learn it.[35] The steps in presenting mind mapping media are: [36]

1) Make sure the theme or subject of the mind mapping and the subject is written in the middle position of a blank paper that is placed horizontally or vertically. Starting from the center gives the brain the freedom to sow in all directions and express itself more freely and naturally.
2) Make sure the image is the main subject. A picture or photo will have a thousand words that can help the brain to use the creativity to say.
3) Using a variety of colors. For the brain, similar colors can add appeal to an image. Color can make mind mapping come alive, increase energy for vision in an innovative and fun way.
4) Searching for a branch topic related to the main subject. Then write one keyword for each topic in the branch. Linking each branch topic, will help to understand and remind more easily.
5) Using an image or a simple code in each branch topic.
6) Looking for links in the branch subject to the main subject. Draw the link by forming a twisting line connecting the branch subject to the main subject using a colored pencil.
7) Set aside an empty space on the paper to add a theme or idea or topic. Empty space is used to put inspiration that immediately arises.

This research develops mind mapping media which also pays attention to the feasibility of material and media aspects. Material feasibility standards need to consider 4 things, they are utility standards, feasibility standards, property standards, and accuracy standards [19]. Meanwhile, in the development of media, it is necessary to pay attention to the service needs, user friendly, attractive, and the benefits for users [20]. Material and media development needs to be done in collaboration with material experts, in this case, lecturers who master career planning materials and media experts have the obligation as assessors of the feasibility of the media to be used. Mind mapping media is very suitable for use in SMKN - 2 Godean which does not have class time service hours so its implementation is very flexible. The previous research explains that mind mapping is the

effective way in helping students in career planning through services outside the class [37].

Furthermore, the material presented in the mind mapping media includes self-knowledge, career exploration, and choosing a career. This is in accordance with the opinion of Crites which said that in compiling career planning, there are 3 things that need to be done, the first one is knowing yourself, means knowing precisely all the potential you have including interests, talents, character, intelligence, and achievements [17]. The description of their abilities brings students to the world of work in a special way, a kind of insight into the type of work and learning required [38]. Then the second one is career exploration, means collecting job information which includes knowing the type of work, recognizing the work skills needed, considering income, and getting information about the type of college. Then the last one is choosing a career that includes setting goals and organizing into long-term and short-term activities, considering the worst possibilities in preparing career plans, and avoiding stress due to routine and failure to achieve the expected career.

In addition, according to Tianzhou Zhang, career planning can also be carried out in 9 steps: 1. Set up career goals 2. Assess requirements of the goals 3. Refine the goals 4. Propose plans 5. Predict the results 6. Select the best scheme 7. Carry out the scheme 8. Assess effects 9. Feedback predetermined goals and adjustment [39].

The material or information contained in the mind mapping media will help students in the preparation of career planning. Planning in a directed career will bring a positive and optimistic attitude which is indicated by a careful planning preparation [38].

5. CONCLUSION

Based on the results of this study and discussion, it can be concluded that mind mapping as a medium is very appropriate to be used in terms of material and media and is quite effective in helping students' career planning at SMKN - 2 Godean.

AUTHORS' CONTRIBUTIONS

The first author is Albertus Hengka Nove as transcript creator and the second author is Edi Purwanta as a supervisor and reviewer in this research.

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