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Research Article

Analysis Of Students Creative Thinking In Solving Transformation Geometry Problems

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Abstract: Creative Thinking Is One Of The Goals Of Learning Mathematics. Where Creative Thinking In Solving Problems Has Many Benefits In Research Analyzes Students' Creative Thinking In Everyday Life. But In Reality, Students Creative Thinking Is Still Low. Therefore, It Is Necessary To Identify Creative Thinking, Especially In The Problem Of Transformation Geometry. This Research Is A Descriptive Study With A Qualitative Approach Carried Out In Fourth Semester Of Mathematics Education In Stkip Sebelas April Sumedang. From The Results And Discussions That Have Been Done, It Can Be Concluded That Students' Creative Thinking Is Inadequate, It Means That They Have Not Been Able To Go Through The Creative Thinking Stages Completely. Of 29 Students Who Were Given Questions, The Results Show None Of Them Who Completely Met The Creative Thinking Stage. The Author Suggests That In Supporting Students' Creative Thinking, It Is Necessary To Develop A Learning Model That Involves Giving Problems And Finding Solutions At The Same Time.

Keywords: Creative Thinking, Creative Thinking Stage, Transformation Geometry

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Introduction

Creative Thinking Is One Of The Objectives Of Mathematics Learning At Every Level Of Education, Including University Education. This Is One Of The Reasons For The Change In The Indonesian National Curriculum From The 2006 Curriculum To The 2013 Curriculum, Which Is To Form Creative Students. The 2013 Curriculum Aims To Prepare Indonesian People To Have The Ability To Live As Individuals And Citizens Who Are Faithful, Productive, Creative, Innovative, And Affective And Able To Contribute To The Life Of Society, Nation, State And World Civilization. Creative Is Also One Of The Main Components In 21st Century Education (Sternberg, 2006; Sternberg, 2012; Navarrete, 2013; Tindowen, Bassig, & Cagurang, 2017; Kawuryan, Hastuti, & Supartinah, 2018; Suryandari, Fatimah, & Prasetyo, 2018). Therefore, The Contemporary Curriculum Emphasizes The Development Of Creative Thinking Skills For Students (Vale, & Barbosa, 2015; Sternberg, 2006; Apriliani, & Suyitno, 2016; Sternberg, 2016). Therefore, Creative Thinking Is One Of The Focuses In Mathematics Education.

Learning Mathematics Requires Everyone To Have The Ability To Understand Formulas, Count, Analyze, Classify Objects, Make Teaching Aids, Make Mathematical Models, And So On. These Activities Do Not Only Require Ordinary (Convergent) Thinking Activities, But Also Require Higher (Divergent) Thinking Skills. People With Divergent Thinking Type Are Able To Generate Or Produce New Ideas And Are Often Associated With Creative Thinking. This Is As Stated By Pehkonen (1997) Which States That Creative Thinking Is A Logical And Divergent High-Level Thinking Skill To Build New Ideas That Are Triggered By Different And Challenging Problems. Divergent Thinking Is Seen As A Mental Operation That Requires The Use Of Creative Thinking Skills, Including Fluency, Flexibility, Originality And Elaboration (Munandar, 2009).

According To La Moma (2015), Creative Thinking In Mathematics Can Be Viewed As An Orientation Or Disposition About Mathematical Instruction, Including Discovery And Problem Solving Tasks. These Activities Can Lead Students To Develop A More Creative Approach To Mathematics. Thus, It Is Clear That The Ability To Think Creatively Is Important And Must Be Mastered By Everyone, Especially In Learning Mathematics.

Siswono (2011) Stated That Creative Thinking Is A Process That Is Used When One Comes Up With A New Idea. It Combines Ideas That Haven't Been Done Before. In General, Creative Thinking Is Triggered By Challenging Problems. The Ability To Think Creatively In Standard Problem Solving By Nctm (2000), It Includes Implementing And Adapting Various Strategies In Solving Problems. Potur & Barkul (2009) Define Creative Thinking As An

Original Cognitive Ability And Problem-Solving Process That Allows Individuals To Use Their Intelligence In A Unique Way And Is Directed Towards A Result. The Aspects Of Mathematical Creative Thinking Skills According To Munandar (2009) Are Fluency, Flexibility, Authenticity, And Elaboration.

Munandar (2009) Indicated That The Ability To Think Creatively Is The Ability To Find Many Possible Answers To A Problem, Where The Emphasis Is On The Quantity, Efficiency, And Diversity Of Answers. Furthermore, Munandar (2009) Explained That The Characteristics Of The Ability To Think Creatively Are Fluency (Fluent Thinking Skills), Namely Fluency In Thinking Skills That Have Characteristics, Namely: Triggering Many Opinions, Answers, Problem Solving, Providing Many Ways Or Suggestions For Doing Various Things, And Always Think Of More Than One Answer; Flexibility (Flexible Thinking Skills), Namely The Skills To Generate Various Ideas, Answers, Or Questions, Being Able To See A Problem From Different Points Of View, Looking For Many Different Alternative Solutions And Being Able To Change The Way Of Approach; Originality (Original Thinking Skills), Namely The Ability To Generate New And Unique Ideas, Think Of Unusual Ways To Express Oneself, And Be Able To Make Unusual Combinations; Elaboration (Detailing Skills), Namely The Ability To Enrich And Develop An Idea Or Product, And Add Details Of A Situation So That It Will Be More Interesting.

Creative Thinking In Mathematics Refers To The Notion Of Creative Thinking In General. According To Silver (1997) And Mann (2005), Creative Thinking In Mathematics Emphasizes Three Aspects, Namely Fluency, Novelty, And Flexibility. Furthermore, In Solving Problems, Students Can Be Said To Think Creatively If They Can Show The Characteristics Of Creative Thinking In Their Thinking Process. Based On Wallas' Theory (Kattou Et Al., 2016) Regarding The Creative Thinking Process, It Consists Of Four Stages, Namely The Preparation Stage, The Incubation Stage, The Illumination Stage, And The Verification Stage. The Detailed Creative Thinking Stages Can Be Seen In The Table Below.

Stages Of Creative Thinking According To Wallas	**Description Of Stages Of Creative Thinking**
Preparation	Be Able To Collect Various Informations That Are Relevant To Given Problems.
Incubation	Temporarily Remove Yourself From Problems And Seek Inspiration. During The Incubation Stage The Ideas That Arise Will Be Linked Together And Organized In The Mind Without Directly Working On The Problem.
Illumination	Starting To Emerge Ideas That Are Solutions To The Problem Given.
Verification	Solutions That Have Been Obtained At The Illumination Stage Need To Be Identified, Checked, Refined Or Developed At The Verification Stage.

From The Description Above, It Is Clear That The Ability To Think Creatively Is Important So That It Must Be Mastered By Elementary School To University Students, Especially In Learning Mathematics. The Importance Of Mathematical Creative Thinking Skills Is Not Directly Proportional To Conditions In The Field. The Mathematical Creative Thinking Skills That Occur Are Still Low. There Is Previous Research Which States That Students' Creative Thinking Skills Are Still Not Maximal, Including What Has Been Done By Murtafiah (2017) With Several Conclusions Including: (1) Students With High Initial Abilities Do Not Have Fluency And Flexibility In Thinking, But Show New Thinking (2) Students With Moderate Initial Abilities Have Fluency In Thinking, But Do Not Yet Have Flexibility And Novelty In Thinking: (3) Students With Low Initial Abilities Do Not Have Flexibility, Fluency, And Novelty In Thinking. From These Conclusions, It Shows, Both Students With High, Medium, Or Low Initial Abilities, Their Creative Thinking Skills Are Still Lacking.

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Methodology

Research Goal

This Research Has The Aim Of Analyzing Students' Creative Thinking In Solving Transformation Geometry Problems On Fourth Semester Of Mathematics Education In Stkip Sebelas April Sumedang. The Benefit Of This Research Is It Can Be Used As A Consideration For Developing A Mathematics Learning Model That Can Support Students' Creative Thinking.

Sample And Data Collection

The Research Will Be Conducted On Fourth Semester Of Mathematics Education In Stkip Sebelas April Sumedang Students, Involving 29 Students. This Research Begins With Compiling Creative Thinking Test Questions In Solving Transformation Geometry Problems. Furthermore, The Test Questions Were Tested On Fourth Semester Of Mathematics Education In Stkip Sebelas April Sumedang Students Who Had Studied The Material. Then The Results Of The Answers From Students Were Analyzed According To The Creative Thinking Stages. Furthermore, Three Students Who Have The Highest Score In The Class, Who Have Moderate Grades, And Who Have Low Scores, Are Taken To Be Taken To Be Interviewed In-Depth. Interviews Were Conducted To Explore More In-Depth Information About The Results Of The Work Of Students Who Had Worked On The Transformation Geometry Test Questions. The Instrument In This Study Was The Researcher Himself Who Was Guided By A Task Sheet Instrument In The Form Of Creative Thinking Test Questions And Interview Guideline Sheets. Researchers Are The Main Instrument, Because Researchers Act As Planners, Data Collectors, Data Analyzers, Data Interpreters, And Finally Become Reporters Of Research Results.

Analyzing Of Data

The Qualitative Data Analyzed In This Research Were The Results Of The Students' Work In Solving The Transformation Geometry Questions And The Results Of Direct Interviews With Students After Completing The Test. The Questions In Qualitative Interviews Are Generally Unstructured And Open Which Are Deliberately Made To Get The Opinion Or View Of The Respondent (Cresswell, 2012). Qualitative Data Will Be Used As A Basis For Analyzing Students' Creative Thinking Processes In Solving Transformation Geometry Problems.

In This Study, The Reliability Analysis Was Carried Out Using The Constant Comparative Method Because In Data Analysis, Data Analysis Constantly Compares One Datum To Another, And Then Constantly Compares Categories With Other Categories (Moleong, 2007). In General, The Data Analysis Process Includes: Data Reduction, Data Categorization, Synthesis, Ending With A Working Hypothesis.

1) Data Reduction, Data Reduction Aims To Facilitate The Understanding Of The Data That Has Been Collected From The Results Of Field Notes By Identifying The Smallest Parts Found In The Data Which Have Meaning If They Are Associated With The Focus And Research Problems, Namely The Didactic Design Of Statistical Materials
2) Categorization, Categorization Is An Effort To Sort Each Unit Into Parts That Have In Common.
3) Synthesization, Synthesizing Means Looking For A Link Between One Category And Another.
4) Developing A "Working Hypothesis", This Is Done By Formulating A Proportional Statement. This Working Hypothesis Is Already A Substantive Theory, Namely A Theory That Originates And Is Still Related To Data. The Working Hypothesis Is Related To And Simultaneously Answers The Research Question.

Results

Based On The Results Of The Analysis Of 29 Students Who Were Given Creative Thinking Test Questions In Solving Transformation Geometry Problems, Three Students Were Taken Based On The Scores They Obtained, A Student Who Has The Highest Score In Their Class (M1), A Student Who Has Moderate Grades (M2), And A Student Who Has A Low Score (M3) To Be Interviewed In Order To Get More In-Depth Information About The Results Of The Work Of Students Who Have Worked On Transformation Geometry Test Questions.
The Following Are Questions On Creative Thinking Tests, Students' Works, And Interview Results From The Three Students.

Dengan adanya bencana alam di suatu daerah, pemerintah menerapkan sebuah aturan (berupa transformasi T) sebagai berikut.
i) Bagi yang rumahnya berada dalam sebuah garis aman yang telah ditentukan yaitu garis g mohon tetap di tempat (T(x) = x, jika x ∈ g).
ii) Bagi yang rumahnya berada di luar garis g mohon berpindah mendekat secara tegak lurus kepada garis g sehingga menjadi setengahnya dari rumah asal ke garis g (T(x) titik tengah ruas garis dari x ke g yang tegak lurus jika x ∉ g).
Apakah aturan tersebut (transformasi T) merupakan sebuah isometri?

Figure 1 Creative Thinking Test Questions

The Results Of The Answers Of Students Who Have The Highest Score In Their Class (M1) In Working On Transformation Geometry Problems Can Be Seen In The Image Below.

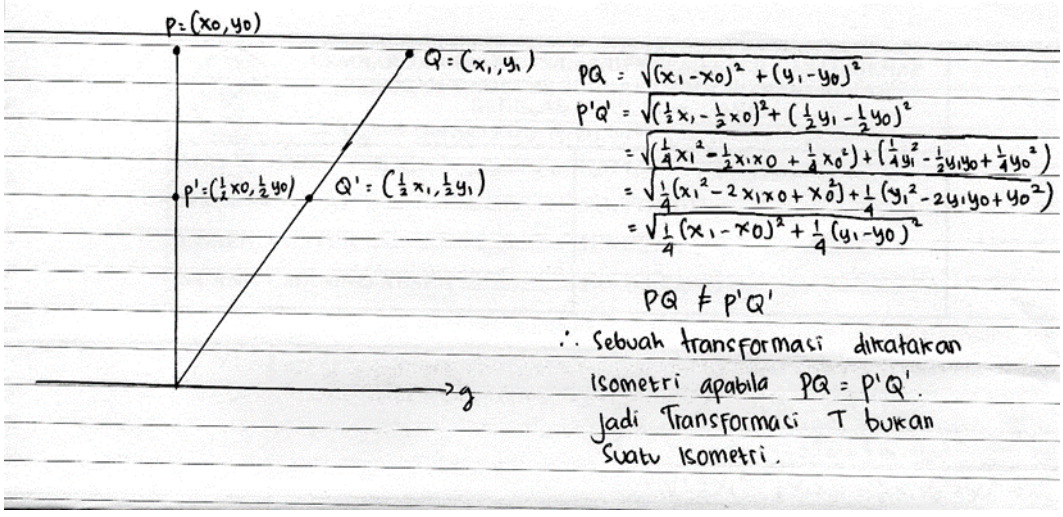

Figure 2. M1 Student's Answer

1. M1 Student Interview Results

A. Preparation Stage

In The Preparation Stage, Students Do Not Write Down The Information Obtained From These Questions, But After Being Interviewed The Results Are As Follows:

D : What Information Was Obtained To Solve The Problem Or Problem?

M1 : The Information Obtained Is A Rule In The Form Of The T Transformation That If T(X) = X, If X ∈ G And T(X) The Center Of The Line Segment From X To G That Is Perpendicular If X ∉ G,

D : Then What Was Asked?

M1 : Is The Transformation Isometric?

D : Why Wasn't That Information Written On The Answer Sheet?

M1 : Just Out Of Habit And So I Can Quickly Go Straight To The Answer Process.

Based On Figure 2 And The Results Of The Interview Above, It Can Be Said That The Preparation Stage Carried Out By M1 Student Ran Smoothly Even Though It Is Not Written On The Answer Sheet, But When Interviewed, The Student Actually Understands The Information On The Problem. It Is Only Because Of The Habit Of Not Writing Down What Is Known And What Is Asked. Thus, The Preparation Stage Can Be Passed Well, Because Students Are Able To Gather Information Well And Think Smoothly.

b. Incubation Stage

The Interview With M1 Student At This Stage Is As The Following Results.

D : After Obtaining The Necessary Information, Did You Get An Idea To Solve The Problem?

M1 : Not At First, But After Relaxing For A While I Finally Got The Idea Of A Solution.

D : Then What Ideas Were Obtained?

M1 : I Have To Draw It First According To The T Transformation Rule, And Then Prove The Isometry By Calculating The Distance

D : How Many Ideas Are There To Complete?

M1 : Actually There Are Many Ways And Many Forms Of Pictures To Solve The Problem, While To Calculate The Distance You Can Use A Formula, You Can Also Use A Ruler As Long As You Draw It According To Your Size.

Based On Figure 2 And The Results Of The Interview Above, It Can Be Said That The Incubation Stage Carried Out By M1 Students Went Smoothly And Found Some Ideas From Their Own Thoughts To Solve The Problems. Thus, The Incubation Stage Can Be Passed Well, Because Students Are Able To Collect Information Well And Have Many Ideas To Solve The Problems Given.

c. Illumination Stage

The Interview With M1 Student At This Stage Is As The Following Results.

D: Why Did You Choose A Picture Like That?

M1: I Think This Is The Simplest Picture To Show That The Transformation Is Isometric.

D: After Making A Drawing, To Show Whether The Transformation Is Isometric Or Not, How Do You Do It?

M1: Using The Distance Formula.

Based On Figure 2 And The Results Of The Interview Above, It Can Be Said That The Illumination Stage Carried Out By M1 Students Resulted In An Idea Of Making An Image That Was Incorrect Or There Was A Slight Error In Making An Image That Was Not In Accordance With The Given T Transformation Rules, It Is At Point Q Was Transformed Into Q 'But Not Perpendicular To The Line G. Finally, The Images Made By M1 Students Do Not Correctly Reflect The Pq Distance And The P'q 'Distance As An Isometric Requirement, Pq = P'q'. One Of The Correct Alternative Images Is As Follows.

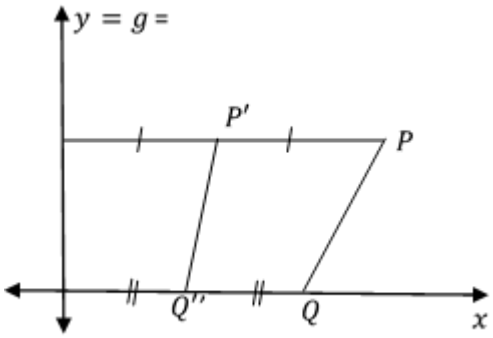

Figure 3. Alternative Answer

Although The Idea To Combine The Distance Formula Is Correct, Because The Pictures Made By M1 Students Are Not Quite Right, The Results Obtained Are Invalid.

d. Verification Stage

The Interview With M1 Students At This Stage Is As The Following Results.

D : After Finishing Working On The Questions, Are You Sure About Your Answer?

M1 : Yes, I Am Sure.

D : Was There Any Attempt To Double Check The Results Of The Work?

M1 : No, I Just Came To The Conclusion That The Transformation T Is Not An Isometric.

Based On Figure 2 And The Results Of The Interview Above, It Can Be Said That The Verification Stage Carried Out By M1 Students Is Inadequate, Because They Do Not Double-Check The Truth Of Their Work. So, The Conclusions Made Are Invalid, This Is Due To The Inaccuracy In Making Images To Determine An Isometric.

The Results Of The Answers Of Students Who Have Moderate Grades In Their Class (M2) In Working On Transformation Geometry Problems Can Be Seen In The Image Below.

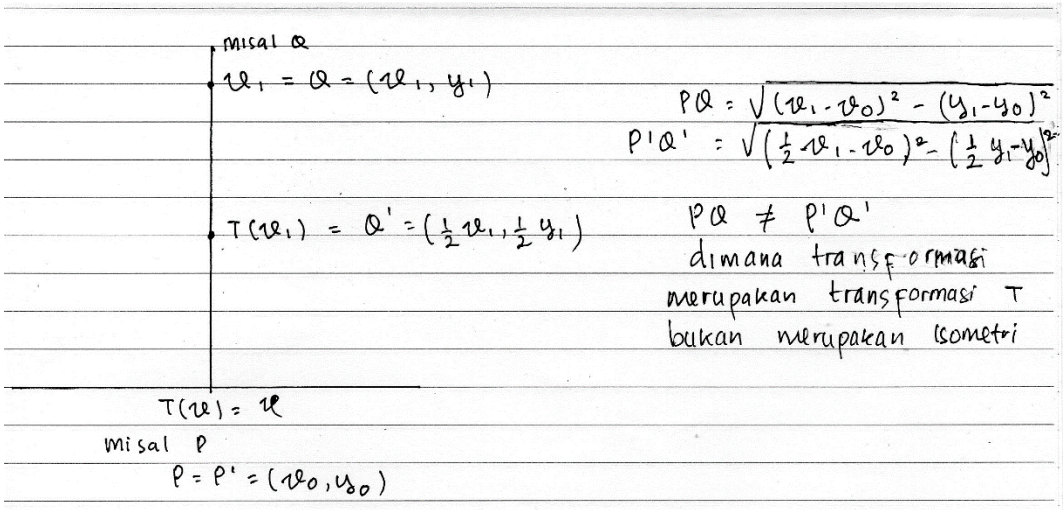

Figure 4 M2 Student's Answer

2. M2 Student Interview Results

A. Preparation Phase

In The Preparation Stage, Students Do Not Write Down The Information Obtained From These Questions, But After Being Interviewed The Results Are As Follows.

D : What Information Was Obtained To Solve The Problem Or Problem?

M1 : In Accordance With The Problem That If Our House Is In A Safe Place, Namely Line G, Then It Is Silent, If It Is Not Safe, We Must Move Perpendicular To The Safe Line With A Half Distance.

D : Then What Was Asked?

M1 : Is The Transformation Isometric?

D : Why Wasn't That Information Written On The Answer Sheet?

M1 : To Be Fast In Doing It.

Based On Figure 4 And The Results Of The Interview Above, It Can Be Said That The Preparation Stage Carried Out By M2 Students Is Almost The Same As M1 Students; It Runs Smoothly Even Though It Is Not Written On The Answer Sheet, But When Interviewed, The Student Actually Understands The Information On The Problem. This Is Only Because It Is Fast In Doing It. Thus, The Preparation Stage Can Be Passed Well, Because Students Are Able To Collect Information And Think Smoothly.

b. Incubation Stage

The Interview With M2 Students At This Stage Is As The Following Results:

D : After Obtaining The Necessary Information, Did You Get An Idea To Solve The Problem?

M1 : Not Yet, But I'm Trying To Calm My Mind While Looking For Ideas.

D : Did You Finally Get The Idea?

M1 : Yes, I Got An Idea.

D : Then What Ideas Were Obtained?

M1 : In Short, I Have To Draw First, And Then Use The Distance Formula.

D : How Many Ideas Are There To Complete?

M1 : More Than One, Especially In Terms Of Making The Actual Image, It Can Be Of Different Shapes.

Based On Figure 4 And The Results Of The Interview Above, It Can Be Said That The Incubation Stage Has Been Carried Out By M2 Students And Found More Than One Idea In Making Pictures Which Are The Results Of Their Own Thoughts To Solve The Problem. Thus, The Incubation Stage Can Be Passed, Because Students Have Been Able To Collect Information From These Questions And Have More Than One Idea To Solve The Problems Given.

c. Illumination Stage

The Interview With M2 Students At This Stage Is As The Following Results.

D : Why Did You Choose A Picture Like That?

M1 : After Trying Several Times To Draw In Doodles, I Found It Difficult To Find A Suitable Image, And I Think That Is The Most Correct In My Opinion.

D : After Making A Drawing, To Show Whether The Transformation Is Isometric Or Not, How Do You Do It?

M1 : To Show Isometry With The Distance Formula.

Based On Figure 4 And The Results Of The Interview Above, It Can Be Said That The Illumination Stage Carried Out By M1 Students Resulted In The Idea Of Making An Incorrect Image, So That It Could Not Combine The Distance And Image Formulas Well, Which Resulted In The Calculation Of The Pq And P'q Distances. Ccannot Be Completed. Both Point P And Point Q Should Be Outside The Line G, But For Student M2's Answer; Point P Is On Line G. This Is What Results Is Incorrect.

d. Verification Stage

The Interview With M2 Students At This Stage Is As The Following Results:

D : After Finishing Working On The Questions, Are You Sure About Your Answer?

M1 : I'm Not Sure, But It's The Best Answer To My Ability.

D : Was There Any Attempt To Double Check The Results Of The Work?

M1 : No. Because It Was Unthinkable To Check Again.

Based On Figure 4 And The Results Of The Interview Above, It Can Be Said That The Verification Stage Carried Out By M2 Students Is Not Appropriate, Because M2 Students Themselves Are Not Sure Of Their Answers And Do Not Double-Check The Truth Of Their Work Because They Are Unthinkable. So, Even Though It Produces A Correct But Invalid Conclusion, It Is Due To An Error In Making The Image To Solve The Problem.

The Results Of The Answers Of Students Who Have Low Scores In Their Class (M3) In Working On Transformation Geometry Problems Can Be Seen In The Picture Below.

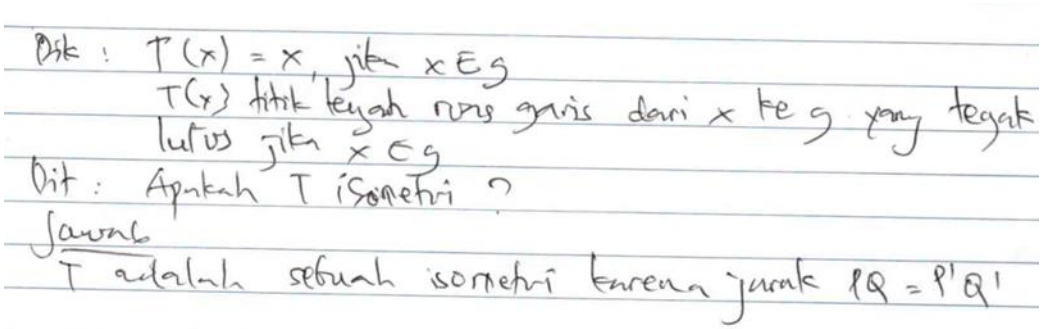

Figure 5. M3 Student's Answer

3. M2 Student Interview Results

a. Preparation Stage

The Interview During The Preparation Stage Conducted By M3 Students Were As Follows:

D : What Information Was Obtained To Solve The Problem Or Problem?

M1 : The Information Obtained Is As Written On The Answer Sheet.

D : Do You Understand This Information?

M1 : Understand A Little, I Wrote It According To The Questions.

Based On Figure 5 And The Results Of The Interview Above, It Can Be Said That The Preparation Stage Carried Out By M3 Students Is Actually Not Optimal. Although The Information Is Written Completely, After Being Interviewed, M3 Students Actually Only Write Down The Information According To The Questions Without Being Well Understood.

b. Incubation Stage

The Interview With M2 Student At This Stage Is As The Following Results:

D : After Obtaining The Necessary Information, Did You Get An Idea To Solve The Problem?

M1 : No, Although I Try To Calm My Mind While Looking For Ideas.

D : Did You Finally Get The Idea?

M1 : No, All I Know Is That To Show The Isometry Must Meet Pq = P'q 'And I Can't Think Of How To Solve It

Because Students Did Not Have An Idea To Complete It, The Interview Was Ended At This Stage.

Based On Figure 5 And The Results Of The Interview Above, It Can Be Said That The Incubation Stage Carried Out By M2 Students Did Not Match Expectations, Because They Did Not Have An Idea To Solve The Problem, So The Answers Were Only Estimations. The Interview Stage Was Not Continued For The Illumination Stage And The Verification Stage, Because Students Had No Idea To Solve These Questions.

From The Description Above, That The Results Of Tests And Interviews Of Students With The Highest Grades In Their Class (M1) Can Be Concluded That M1 Students Have Just Fulfilled The Stages Of Creative Thinking Preparation And Incubation Perfectly. Meanwhile, The Illumination And Verification Stages Have Not Been Achieved Properly. For Students With Moderate Grades In Class (M2), It Can Be Concluded That New M2 Students Have Fulfilled The Stages Of Creative Thinking Preparation And Incubation. However, The Illumination And Verification Stages Have Not Been Fulfilled. Although Both Of Them Both

Do Not Meet The Illumination And Verification Stages, The Difference Is That M1 Students Use The Distance Formula Correctly, While M2 Students Did It Incorrectly. Besides That, In Drawing Pictures, M1 Students Only Made Minor Mistakes, While M2 Students Draw Pictures With Fatal Mistakes. Meanwhile, For M3 Students It Is Still Far From Being Expected, At The Preparation Stage, M3 Students Still Do Not Understand The Information From The Questions Well.

Discussion

Based On The Results Of The Analysis On Students M1, M2, And M3, No One Has Carried Out The Stages Of The Creative Thinking Process Completely And Well, Even Students Who Have The Highest Scores Have Not Fulfilled All Stages. This Problem Is Because Students Are Rarely Given Problems That Make Students Less Creative Thinking, Students Only Follow What Has Been Said By The Lecturer. This Is As Stated By Silver (1997) That To Encourage Students To Have The Ability To Think Creatively In Mathematics Is Through Problem Solving. Therefore, Students Are Rarely Given Problems In The Form Of Problems, Especially In Transformation Geometry, So That Students Rarely Find Their Own Solutions, In The Sense That Students Only Follow The Example Given By Their Lecturers. For This Reason, It Is Necessary To Develop A Learning Model That Requires Giving Problems As Well As Finding Solutions, As Well As Learning Media That Guide Students To Carry Out Independent Learning.

As Explained Above, The Creative Thinking Stages Based On Wallas Consist Of The Incubation Stage, The Illumination Stage, And The Verification Stage. For The Preparation And Incubation Stages, A Learning Step Is Needed That Involves Giving Problems (Problems) In Its Implementation. With Frequent Problems In Learning, Students Will Be Trained In Understanding The Information Provided, Changing, And Transferring What Has Been Learned. This Is In Accordance With The Opinion Of Bruner (Dahar, 2006) That In Teaching, Students Are Guided Through A Sequence Of Statements Of A Problem Or A Set Of Knowledge To Increase The Ability Of Students To Accept, Change, And Transfer What They Have Learned. Teachers Should Plan Lessons In Such A Way That The Lessons Focus On Appropriate Problems For Learners To Investigate. This Is Also In Accordance With The Social Constructivist Philosophy Which Views Mathematical Truth As Not Absolute And Identifies Mathematics As The Result Of Problem Solving And Problem Solving By Humans (Ernest, 1991).

At The Stage Of Illumination And Verification, A Learning Step Is Needed That Emphasizes The Discovery Of A Solution To A Given Problem. With Learning That Emphasizes Discovery, Students Will Try On Their Own To Solve Problems And Put The Results Of The Examiners In The Form Of Conclusions. This Is In Accordance With The Opinion Of Bruner (Dahar, 2006) Who Considers That Discovery Learning Is In Accordance With The Active Search For Knowledge By Humans And By Itself Gives The Best Results. Trying On Your Own To Find Solutions To Problems And The Knowledge That Goes With Them, The Result In Knowledge That Is Truly Meaningful. In Discovery Learning, The Real Goal Of Learning Is To Acquire Knowledge In A Way That Exercises Their Abilities. This Is What Is Meant By Gaining Knowledge Through Discovery Learning. In Discovery Learning, Teachers Should Present The Required Subject Matter As A Basis For Students To Solve Problems. From This Description, The Authors Suggest That In Supporting The Creative Thinking Process Of Students, It Is Necessary To Develop A Learning Model That Involves Giving Problems And Finding Solutions At The Same Time.

Conclusion

From The Results And Discussion Above, It Can Be Concluded That Creative Thinking In Solving Transformation Geometry Problems On Fourth Semester Of Mathematics Education In Stkip Sebelas April Sumedang Students Is Inadequate, Meaning That It Has Not Been Able To Go Through The Stages Of Creative Thinking Completely And Well. Of The 29 Students Who Were Given Creative Thinking Questions, The Result Was That None Of Them Were Correct And Completely Fulfilled All The Stages Of Creative Thinking. For M1 Students, Just Complete The Stages Of Creative Thinking Preparation And Incubation Perfectly. Meanwhile, The Illumination And Verification Stages Have Not Been Achieved Properly. For Students With Moderate Grades In Class (M2), It Can Be Concluded That New M2 Students Have Fulfilled The Stages Of Creative Thinking Preparation And Incubation. However, The Illumination And Verification Stages Have Not Been Fulfilled. Although Both Of Them Both Do Not Meet The Illumination And Verification Stages, The Difference Is That M1 Students Use The Distance Formula Correctly, While M2 Students Are Still Wrong. Besides That, In Making Pictures, M1 Students Only Made Minor Mistakes, While M2 Students Made Pictures With Fatal Mistakes. Meanwhile, For M3 Students It Is Still Far From Being Expected, At The Preparation Stage Only M3 Students Still Do Not Understand The Information From The Questions Well.

Recommendations

From The Discussion And Conclusions Above, It Can Be Seen That Students' Creative Thinking In Solving Transformation Geometry Problems Is Inadequate. So, We Need A Learning Model That Can Support Students' Creative Thinking. The Author Suggests That In Supporting Students' Creative Thinking, It Is Necessary To Develop A Learning Model That Involves Giving Problems And Finding Solutions At The Same Time.

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