

**DIAGNOSIS OF STUDENTS' CONCEPTION ON LIGHT AND OPTIC
TOPICS WITH FOUR-TIER TEST**

RESEARCH PAPER

Submitted as Requirement to Obtain Degree of *Sarjana Pendidikan* in
International Program on Science Education (IPSE) Study Program



Rossy Andini Herindra Putri

1703043

**INTERNATIONAL PROGRAM ON SCIENCE EDUCATION
FACULTY OF MATHEMATICS AND SCIENCE EDUCATION
UNIVERSITAS PENDIDIKAN INDONESIA**

2021

**DIAGNOSIS OF STUDENTS' CONCEPTION ON LIGHT AND OPTIC
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Skripsi ini diajukan untuk memenuhi salah satu syarat
memperoleh gelar Sarjana Pendidikan
pada Program Studi International Program on Science Education (IPSE)
Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam

Rossy Andini Herindra Putri
Universitas Pendidikan Indonesia
Agustus 2021

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APPROVAL SHEET

DIAGNOSIS OF STUDENTS' CONCEPTION ON LIGHT AND OPTIC TOPICS WITH FOUR-TIER TEST

By:

Rossy Andini Herindra Putri
1703043

Approved:

Supervisor I



Prof. Dr. Ari Widodo, M.Ed.
NIP. 196705271992031001

Supervisor II



Lilit Rusyati, S.Pd., M.Pd.
NIP. 198704202012122001

Perceived by,

Head of International Program on Science Education Study Program



Dr. Eka Cahya
Prima
2021.08.16
14:28:37 +07'00'

Dr. Eka Cahya Prima, S.Pd., M.T.
NIP. 1990062622024041001

DECLARATION

I do hereby declare that every aspect was written in this research paper entitled “**Diagnosis of Students’ Conception on Light and Optic Topics with Four-Tier Test**” is the original result of my idea, efforts, and works without copying or plagiarizing from other papers. The theories, opinions, and others that are contained in this paper have been quoted or referenced based on scientific code from UPI and under scientific ethics that applies in scholarly society. This declaration is created truthfully and mindfully. Unless it is eventually considered to be a violation of scientific ethics, or whether there is a statement by the other to the authenticity of this research paper, I can accept the authorization of scholars or copyright that are found. Hence, I am willing to take responsibility and accept academic sanctions corresponds to the rules.

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Declarant,



Rossy Andini Herindra Putri

1703043

ACKNOWLEDGEMENTS

The author praises gratitudes to Allah SWT for His Mercy so that the author can finish this research paper. On this occasion, the author would also like to express deep and sincere gratitude and appreciation to the following:

1. Prof. Dr. phil. Ari Widodo, M.Ed. as the first supervisor who always guides me to finish this research paper and encourages the author to go beyond the limit.
2. Lilit Rusyati, S.Pd., M.Pd. as my second supervisor for all the encouragement, guidance, motivation, and emotional support along with the author's research paper writing. Thank you for being very supportive and forgiving all the time.
3. Dr. Eka Cahya Prima, S.Pd., M.T. as the Head of International Program on Science Education Study Program. Thank you for all your dedication. Thank you for always giving the best for the study program.
4. Eliyawati, M.Pd. as 2017 batch academic supervisor who always shares her experiences and knowledge and motivates the 2017 batch since day one.
5. All IPSE Lecturer, Laborant, and Administrator Dr. Diana Rochintaniawati, M.Ed., Rika Rafikah Agustin, M.Pd., Eliyawati, S.Pd., M.Pd., Lilit Rusyati, S.Pd., M.Pd., Mary Margaret Thomas, M.Sc., Ph.D., Dr. Eka Cahya Prima, S.Pd., M. T., Dr. Nanang Winarno, S.Si., S.Pd., M.Pd., Ikmanda Nugraha, M.Pd., Resik Ajeng Maria, M.Pd., Mr. Latief Budiana, and Ms. Dhea Aprilia Andhini, thank you for all your help, support, guidance, and knowledge for the author since 2017 until today and more.
6. All junior high schools that are related to this research, thank you for giving the author the chance to conduct the research there. Thank you for giving the author your trust.
7. Beasiswa Unggulan Kemdikbud RI, thank you for the honorable "awardee" predicate and for being the financial sponsor for the author through college.
8. Anah Rihanah Sasmita, my dearest mother. Thank you for supporting the author in every kind of way possible. Never going to make it without you.
9. All of my family members. Bapak thank you for being so kind and patient, Uwa thank you for loving the author as your own, Ma Entin thank you for

taking care of the author all this time, Aang thank you for all your sacrifices, Aang thank you for always knowing what to say, Teh Heti thank you for being so kind and understanding, and Biwi thank you for making me love to learn. Thank you for your help and support all this time. Thank you for putting the author over your selves.

10. Abang, Ade, Arfi, thank you for being a sweet cute little distractor. The author cares about you dearly.
11. My dearest friends, Ndi, Tasya, Tiara, Sofi, Ka Ia, Icha, Cici, Kaha, Shafa, and Nurs. Thank you for taking care of the author when the author's family is not around.
12. Sulistinayah Suwaka Putri, Thank you for sharing the journey of Monday and Wednesday morning.
13. All IPSE 2017 students Mia Wulansani, Miftah Ummi Hanifa, Salma Khoirotunnisa, Annisa Fadhila Nur Fikriah, Nur Shinta Ratna Wulan, Xavierina Dewi Endangsari Adiningsih, Arsanti Satriani Salim, Sulistinayah Suwaka Putri, Sofi Alfiani, Kamila Putri Nursyahbani, Raisha Nur Kanina, Syahida Ainnaya, Naufal Rabah Wahidin, Putri Sekar Melati, Erika Oktaviani, Tashya Alfiah Yasin, Tiara Syifanida, Shafa Rihadatul Aisy, Nadira Renata Putri, Dhika Andaresti Lazuardi, Diana Ayu Latifah, and Novi Nursafitri, thank you for going through the whole four years alone together.

DIAGNOSIS OF STUDENTS' CONCEPTION ON LIGHT AND OPTIC TOPICS WITH FOUR-TIER TEST

Rossy Andini Herindra Putri
International Program on Science Education
rossyandini@upi.edu

ABSTRACT

Students' conception is defined as the way students making sense of a range of natural phenomena. Identifying students' conception is very essential because it leads to more focused teaching and enables teachers to prevent and eliminates misconceptions. The four-tier test is chosen because it is a stronger and more sensitive diagnostic test. Light and optic topics are chosen because it is an essential topic at school and there are repetitive misconceptions in these topics. Therefore, students' conception on light and optic topics is diagnosed with the four-tier test in this research. The instruments were constructed from a list of indicators. The questions were administered online to 817 8th-grade students. Students' conception is categorized into five which are scientific knowledge, false positive, false negative, misconception, and lack of knowledge. Frequencies and percentage are calculated with excel program and the data is further analyzed with Mann-Whitney U test to see if there is any significant difference between students who have learnt the topics and who have not. The result shows that that in general, students have more misconception than scientific knowledge, students did best in the formation of image on mirrors, students did worst in the optical instruments, and there is no significant difference between students who have learnt the topics and who have not. The causes are unfronted misconceptions, online learning, and unfamiliarity. This indicates that teachers have to address common misconceptions in class, facilitating conceptual change by hands-on activities, and relate the concept with students' daily life.

Keyword: Students' conception, Four-Tier Test, Light and Optic, Misconception

DIAGNOSIS KONSEPSI SISWA PADA TOPIK CAHAYA DAN OPTIK DENGAN TES DIAGNOSIS EMPAT TINGKAT

Rossy Andini Herindra Putri
International Program on Science Education
rossyandini@upi.edu

ABSTRAK

Konsepsi siswa adalah cara siswa untuk memahami fenomena di sekitarnya. Mendiagnosa konsepsi siswa sangat penting untuk melakukan pembelajaran yang lebih fokus serta mencegah dan mengurangi miskonsepsi siswa. Tes pilihan ganda empat tingkat (*four-tier test*) lebih kuat dan lebih sensitif untuk mendiagnosa konsepsi siswa dibandingkan dengan jenis tes lainnya. Cahaya dan optik adalah salah satu materi penting dan terdapat miskonsepsi yang terdeteksi berulang. Karenanya, konsepsi siswa dalam bab cahaya dan optik akan didiagnosa menggunakan soal pilihan ganda empat tingkat. Instrumen dibuat dari daftar indikator dan disebar secara online kepada 817 siswa kelas 8. Konsepsi siswa dikelompokkan menjadi pengetahuan saintifik, positif palsu, negatif palsu, miskonsepsi, dan kurang pengetahuan (*scientific knowledge, false positive, false negative, misconception, and lack of knowledge*). Data analisis dilakukan melalui excel untuk memperoleh frekuensi dan persentase. Tes Mann-Whitney U juga dilakukan untuk melihat perbedaan antara siswa yang sudah menerima materi dan siswa yang belum menerima materi. Hasil penelitian menunjukkan bahwa miskonsepsi siswa lebih tinggi dari pemahamannya, siswa memperoleh skor tertinggi dalam pembentukan bayangan pada cermin, siswa meraih skor terendah pada alat-alat optik, dan tidak ada perbedaan signifikan antara siswa yang sudah menerima materi dan yang belum. Hal tersebut diakibatkan oleh miskonsepsi yang tidak dibahas dikelas, pembelajaran online dan ketidakfamiliaran siswa. Oleh karena itu guru dalam pembelajaran guru harus membahas miskonsepsi, melakukan pembelajaran aktif, dan mengaitkan materi dengan kehidupan sehari-hari.

Kata Kunci: Konsepsi Siswa, Diagnosis Tes Empat Tingkat, Cahaya dan Optik, Miskonsepsi

TABLE OF CONTENTS

APPROVAL SHEET	i
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	v
TABLE OF CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF APPENDICES	xi
CHAPTER I INTRODUCTION	1
1.1 Background.....	1
1.2 Research Problem.....	5
1.3 Research Question.....	5
1.4 Limitation of Research	6
1.5 Research Objective.....	6
1.6 Research Benefit	6
1.7 Organizational Structure of Research Paper.....	7
CHAPTER II LITERATURE REVIEW.....	8
2.1 Students' Conception	8
2.2 Four-Tier Test as Diagnostic Instrument.....	10
2.3 Content Analysis on Light and Optic Topics	11
2.3.1 The Properties of Light	12
2.3.2 The Image Formation on Mirrors	13
2.3.3 Human Eye.....	13
2.3.4 Optical Instrument	14

CHAPTER III RESEARCH METHODOLOGY	15
3.1 Research Design.....	15
3.2 Sample	15
3.3 Operational Definition.....	16
3.4 Research Instrument	17
3.4.1 Correlation and Reliability Test	19
3.5 Research Procedure	21
3.6 Data Analysis	23
CHAPTER IV RESULT AND DISCUSSION	26
4.1 Student’s Conception on Light and Optic Topics	Error! Bookmark not defined. 26
4.1.1 Students’ Conception on The Properties of Light.....	Error! Bookmark not defined. 32
4.1.2 Students’ Conception on The Formation of Image on Mirrors.	Error! Bookmark not defined. 36
4.1.3 Students’ Conception on Human Eye.....	41
4.1.4 Students’ Conception on Optical Instrument	45
4.2 Students’ Misconception on Light and Optic Topics.....	50
4.2.1 Question 13	51
4.2.2 Question 10	54
4.2.3 Question 18	56
4.2.4 Question 19	59
CHAPTER V CONCLUSION, IMPLICATION, AND RECOMMENDATION	63
5.1 Conclusion	63
5.2 Implication	64
5.3 Recommendation	64
REFERENCES	65

APPENDICES	77
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LIST OF TABLES

Table 3.1 Participant Distribution.....	16
Table 3.2 Distribution of Questions.....	17
Table 3.3 Sample Question	18
Table 3.4 The Result of Correlation Test.....	20
Table 3.5 The Result of Reliability Test	21
Table 3.8 Combination Answer and Decision on Four-tier Test. Error! Bookmark not defined.	24
Table 4.1 Conception Comparison of Students Who Have Learnt the Topics and Who Have Not in Light and Optic Topics	30
Table 4.2 Conception Comparison of Students Who Have Learnt the Topics and Who Have Not on The Properties of Light	35
Table 4.3 Conception Comparison of Students Who Have Learnt the Topics and Who Have Not on The Formation of Image on Mirrors	Error! Bookmark not defined.
Table 4.4 Conception Comparison of Students Who Have Learnt the Topics and Who Have Not on Human Eye	43
Table 4.5 Conception Comparison of Students Who Have Learnt the Topics and Who Have Not on The Optical Instrument	Error! Bookmark not defined.
Table 4.6 Question 13	51
Table 4.7 Question 10	54
Table 4.8 Question 18	57
Table 4.9 Question 19	60

LIST OF FIGURES

Figure 3.1 The Flowchart of Research Procedure	23
Figure 4.1 Students' Conception on Light and Optic Topics.....	27
Figure 4.2 Students' Conception on The Properties of Light	33
Figure 4.3 Students' Conceptions on The Formation of Image on Mirrors.. Error! Bookmark not defined.	37
Figure 4.4 Students' Conceptions on Human Eye.....	42
Figure 4.5 Students' Conceptions on Optical Instrument	46
Figure 4.6 Students' Misconceptions on Light and Optic Topics	Error! Bookmark not defined.
Figure 4.7 Answer Combination of Students' Misconceptions on Question 13 ...	53
Figure 4.8 Answer Combination of Students' Misconceptions on Question 10 ...	55
Figure 4.9 Answer Combination of Students' Misconceptions on Question 18 ...	58
Figure 4.10 Answer Combination of Students' Misconceptions on Question 19 .	61

LIST OF APPENDICES

Appendix A.1 Four-Tier Diagnostic Instrument	79
Appendix A.2 Validity and Reliability Test I (IBM SPSS Version 23)	Error!
Bookmark not defined.	89
Appendix A.3 Validity and Reliability Test II (IBM SPSS Version 23)	Error!
Bookmark not defined.	92
Appendix A.4 Critical Values of the Product Moment Correlation Coefficient ...	93
Appendix B.1 Conception Recap of Students Who Have Learnt Light and Optic Topics	95
Appendix B.2 Conception of Students Who Have Not Learnt The Topics Recap	96
Appendix B.3 Normality Test Result and Mann-Whitney U Test of Students Who Have and Who Have Not Learnt Light and Optic Topics in General	97
Appendix B.4 Normality Test Result of Students Who Have Learnt Light and Optic Topics in Subtopic	98
Appendix B.5 Normality Test Result of Students Who Have Not Learnt Light and Optic Topics In Subtopic	99
Appendix B.6 Mann-Whitney U Test Result In Subtopic	100
Appendix C.1 Permission from Study Program	102
Appendix C.1 Permission from Faculty	103
Appendix C.1 Permission from School.....	105
Appendix C.4 Approval Form Supervisor	106
Appendix C.5 Judges Review.....	107
Appendix D. 1 Documentation.....	110
Appendix D.2 Autobiography	111

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