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Development of Learning Material in Behavioral Economics for Higher Education

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Abstract

Economic man (*homo economicus*) in the view of classical economics is an individual who is independent, autonomous, and rational, who pursue maximum satisfaction with minimum costs. However, as a human being, we often make irrational or unreasonable decisions because of cognitive biases. The irrationality of the individualdue to instincts or feelings that are used as a consideration in making decisions without using rationality in thinking. This topic can be studied in the discussion of Behavioral *Economics.* The dominance of neoclassical economics in educational curricula is a prominent concern. However, promoting behavioral economics may encourage students to make better economic decisions. This study aims to develop and assess the feasibility and effectiveness of learning materials in behavioral economics for higher education in order to help students make complex decisions. This paper followed the development procedures outlined by Dick and Carey for instructional design and was tested in the classroom using an experimental approach. Four experts validated the content, and 30 under graduate students at Universitas Negeri Surabaya participated in the experimental study. The findings reveal that the learning material development was reviewed and validated by experts and underwent some revisions and enhancement. Based on the analysis, the development feasibility level scored 81, and the N-Gain was 56.22%, indicating that the teaching material was quite feasible and effective. Therefore, the behavioral economics teaching material can be used for higher education.

Keywords: Learning, Education, Classroom, Design

Introduction

Homo Oeconomicusin neo-classical economic theories is a rational being(Chaiklin 1989), in the sense that their actions are always based on the desire to obtain the maximum benefit (maximising utility). They are selfish individuals, who prioritize self-interest above all else, independent, autonomous, and rational.However, as a human being, individuals also often make irrational or unreasonable decisions. This is because there are instincts or feelings that are used as considerations in making decisions without using rationality in thinking.

Some textbooks write that economic actors are assumed to be rational individuals. However, the relevance of these assumptions is being questioned at the present time regarding the goals of individuals as economic actors in carrying out consumption and production activities. In consumption activities raises the question whether individuals always maximize satisfaction when consuming goods/services and producers aim to achieve maximum profits in producing goods and services. This becomes a debate and questions whether the rationality of individual behavior in economic activities applies to all situations because people may not behave as written in traditional economics textbooks. People who have rational thinking are assumed to be able to weigh costs and benefits correctly and calculate the best choice for themselves. A rational person is also expected to know his preferences (both present and future), and never fluctuate between two conflicting desires. Traditional economics uses these assumptions to predict actual human behavior. Conversely, behavioral economics based on psychology is done to find out the reasons why someone sometimes makes an irrational decision.

Behavioral economics is an essential field of study that has gained increasing attention in recent years (Wahyono et al., 2021; Narmaditya et al., 2023). As higher education institutions strive to produce well-rounded graduates, it is essential that they incorporate behavioral economics material into their teaching and learning activities (Seethamraju, 2012). Some scholars have remarked that traditional economics courses often fail to adequately prepare students for the complexities of decision-making in the real world (Sunstein, 2015; Thaler & Sunstein, 2008). On the other hand, behavioral

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economics examines how psychological, social, and emotional factors influence economic decision-making (Thaler, 2018). By involving behavioral economics, individuals can gain a deeper understanding of how individuals and organizations make decisions, and how biases and heuristics can influence these decisions.

Incorporating behavioral economics into higher education can also help students develop important skills that are highly valued in the job market (Lavecchia et al., 2016). For example, critical thinking, problem-solving, and data analysis skills can be enhanced through the study of behavioral economics (Thaler, 2018). Additionally, the ability to understand and predict human behavior is becoming increasingly important in fields such as marketing, finance, and public policy (Wahyono et al., 2021). To ensure that students receive the most comprehensive education possible, it is essential that higher education institutions develop and implement behavioral economics material into their courses (Williamson et al., 2020). In doing so, students will be better equipped to navigate the complex decision-making processes they will face in their personal and professional lives.

The need for behavioral economics is becoming increasingly relevant in the context of the digitalization of economics (Krajinovic et al., 2018). The basic rationale is that the advent of digitalization has revolutionized the market and transformed consumer behavior. The proliferation of digital platforms, e-commerce, and online connectivity has reshaped the way consumers interact with businesses and make purchasing decisions (Taneja, 2021). This condition often leads to consumptive behavior, which can further lead to debt traps (Narmaditya et al., 2023). While this can enhance decision-making efficiency, it also raises concerns about the potential manipulation of choices and the reinforcement of existing biases (Jenssen et al., 2019). Behavioral economics sheds light on how individuals' decision-making processes may be influenced by algorithmic recommendations and the impact of digital nudges on our behavior (Bogan, 2019; Thaler, 2018).

While the dominance of neoclassical economics in the educational curriculum is a valid concern (Bogan, 2019; Shanks, 2019). For instance, a prior study noted that economic actors are assumed to be rational individuals (Heukelom, 2014). However, the relevance of these assumptions is being questioned at the present time regarding the goals of individuals as economic actors in carrying out consumption and production activities (Espin et al., 2017). An example in consumption activities raises the question of whether individuals always maximize satisfaction when consuming goods or services, while producers aim to achieve maximum profits in producing goods and services (Barberis, 2013). This becomes a debate and questions whether the rationality of individual behavior in economic activities applies to all situations because people may not behave as written in traditional economics textbooks (Thaler, 2016; Levitt et al., 2016).

Considering this matter, this study is intended to investigate the feasibility and effectiveness of using behavioral economics learning materials. Providing these materials has several benefits. First, teaching and learning behavioral economics can help students understand their own decision-making processes. Second, unlike traditional economics, which assumes that people always think rationally and in their own best interest, behavioral economics confess that people's decisions are affected by cognitive biases, emotions, social norms, and other psychological dimensions (Altman, 2012). This more comprehensive understanding allows individuals to analyze real-world economic phenomena more accurately. Third, integrating behavioral economics into higher education allows students to apply economic principles to real-life scenarios and understand the practical implications. This applied relevance fosters critical thinking, problem-solving skills, and the ability to analyze complex economic issues in diverse contexts.

The purpose of this study was to measure the feasibility and effectiveness of developing Behavioral Economics teaching materials. Section 2 deals with the methodology used to develop and assess the feasibility and effectiveness of behavioral economics. Section 3 presents the findings, accompanied by discussion in Section 4. The last section deals with the conclusion of this study.

Method

Study Design

The paper expanded the Dick and Carey (2005) instructional model to develop the learning materials of Behavioral Economics, and investigates the feasibility and effectiveness to help students in making decision. In detail, the procedures of this study is provided as follows (1) identifying instructional goals—determine the desired outcomes of the instruction and objectives, (2) conducting instructional analysis—identify the characteristics and needs, (3) analyzing student characteristics and context—determine the entry behaviors, prior knowledge, and abilities of the learners, (4) formulating specific instructional objectives—write clear and measurable objectives, (5) developing assessment instruments—providing learning materials (6) developing instructional strategies—developing process, (7) developing and selecting appropriate instructional materials, (8) designing and conducting formative evaluations, (9) revising learning materials, (10) designing and conducting summative evaluations.

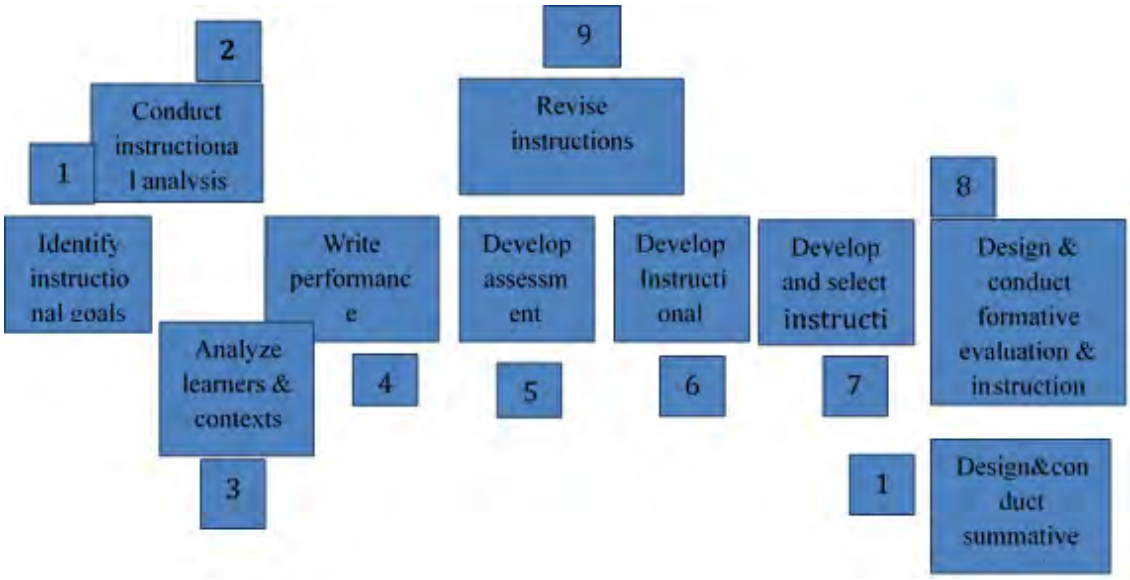

Fig. 1: Developmental model Dick and Cary, 2005

Validation

Teaching material products for the Behavioral Economics course are considered valid if they meet the validity of the experts. Data analysis was developed by authors through slight modification based on the scores of experts judgments. In this study, we involved four experts to reach their consensus. In detail, the formula to measure learning materials is provided as follows.

Table 1: Criteria for Assessment

Achievement	*Decision*
85%-100%	Very worth
75%-84%	Worthy
65%-74%	Pretty decent
55%-64%	Not worth
0-54%	Not feasible

Data Collection, Procedures, Evaluation

In this study, we involved 30 bachelor students in Economics Education who had taken the Microeconomics course. The selection of students considered their characteristics, including their level of understanding, skills, interests, learning styles, and other relevant factors. The research was conducted at Universitas Negeri Surabaya in Indonesia in August 2022 and took approximately eight months to complete. During the process, three observers were present to help gather information. The respondents were informed of the academic purposes only and were assured of anonymity to comply with ethical clearance. The data collected from the experimental group test was analyzed using pre-test and post-test scores before and after using the product. The data was analyzed using (1) descriptive percentages to determine the percentage of pre-test and post-test gains, (2) t-test to determine significant differences between pre-test and post-test gains after treatment, and (3) N-gain test to find out the effectiveness of the teaching materials for the behavioral economics course. The formula for the N-gain test is described as follows:

Table 2: N-Gain Score Distribution

N-Gain Value	*Decision*
> 0.7	High
0.3 > 0.7	Medium
< 0.3	Low

Table 3: Category Interpretation of N-Gain Effectiveness

Percentage (%)	Decision
<40	Ineffective
40-55	Less effective
56-75	Moderate effective
>76	Effective

Results and Discussion

Expert Validity

Table 4 shows the data obtained from the material expert's assessment of the lecture tools developed using the material expert validation sheet instrument. The results of the expert's assessment of the material are analyzed to determine the feasibility level of the product being tested. The analyzed

Table 4: The results of the expert's evaluation

No.	*Rated aspect*	*Score*
1.	The material presented is appropriate to the learning objectives	5
2.	The concepts are presented appropriately	5
3.	The apperception contained in the media can strengthen students' memories	4
4.	The topics covered are clearly understandable	4
5.	The material is discussed coherently	4
6.	The material has been covered as a whole in teaching materials	3
7.	The material is discussed thoroughly.	5
8.	The level of difficulty of the concept corresponds to the thinking level	4
9.	The examples are appropriate with the real condition	4
10.	The examples are presented clearly and support the student understanding	3
11.	The material presented support independent learning for students.	5
12.	The evaluation given is in accordance with the learning objectives.	4
13.	The questions presented are in accordance with Problem Based Learning (PBL)	4
14.	Learning aspect that include cognitive, psychomotor and affective	4
15.	Instructions for teaching materials and evaluation are presented clearly	2
16.	The terms used are precise and appropriate.	4
17.	The use of language supports the ease of understanding the flow of material.	5
18.	The text used in teaching materials can convey the material appropriately	5
19.	Presentation of the material encourages students to be actively in learning.	5
20.	Presentation of attractive and proportional curves/images.	3
21.	The material presented supports perceived ease to use	5
22.	Evaluations are easy to use in the learning process independently or in groups	5
23.	syllabus, lesson plans, teaching materials and evaluation support students to be able to learn independently	4
24.	Media can enhance the motivation of students in learning the material	4
25.	Media can increase the knowledge of students	4
26.	The media is able to broaden students' insights in the field of economics.	4
27.	The design and cover image give a positive impression	4
28.	Text and writing are easy to read.	5
Total score		112

data is adjusted to the predetermined percentage feasibility table. The material expert assessment consists of 28 question indicator items, with the highest score being 5 and the lowest score being 1. If each item gets the highest score of 5, the total score is calculated as 5 x 28 = 140. If each item gets the lowest score, the total score is calculated as 1 x 28 = 28. Based on the output of the research, the total score given by the material experts is 112. Therefore, the assessment of the material experts is (112/140) x 100% = 80%. According to the feasibility estimation in Table 4, the material falls into the valid category.

Experimental Study

The respondents for this investigation were students from the Economics Education Study Program at Universitas Negeri Surabaya, Class of 2022, who had taken and passed the Introduction to Microeconomics course. The rationale behind this selection was that students had already learned about human concepts in microeconomics and human rationality in decision-making, which is the basis for understanding the material in behavioral economics. Behavioral economics provides new knowledge and understanding that humans are not always rational when making economic decisions. The students were over 18 years old on average, possessing the critical, creative, mathematical, and abstract reasoning skills necessary to study the behavioral economics material in this study.

A field trial was carried out on 30 students who had taken the Microeconomics course. The trial began with pre-test questions, followed by the delivery of material and

working on behavioral economics student activity sheets in nine chapters. After completing the material, students were given post-test questions. Both the pre-test and post-test consisted of 20 multiple-choice questions with five answer choices. The scores from these tests were used to measure the effectiveness of the Behavioral Economi1cs courseware products developed. After completing the pre-test, the first material was delivered through a video about the introduction of behavioral economics and the factors that influence individuals in making decisions.

After the video, the researcher continued to explain the notion of behavioral economics, research results, individual thought systems by Kahneman, the theory of reason behavior and planned behavior, and the thoughts of Richard Thaler. This was followed by questions and answers, conclusions, and the end of the first meeting. The second meeting covered prospect theory and social preferences. At the end of this session, students were given student activity sheets to work on and discuss in the next meeting. The third meeting explained heuristics and cognitive bias and discussed student activity sheets on classical economics and behavioral economics and "Making Decisions". The fourth meeting explained the material through PowerPoints about nudge theory, and the lesson concluded with a post-test. The learning was carried out in a hybrid manner, with online implementation using Zoom and offline in-class implementation.

Table 5 exhibits the percentage increase before implementing the learning material using Behavioral Economics and after implementation in the classroom. Student acquisition score before using the product was 42.3% and after using the product was 75.6%. Thus, the percentage increase in score is 33.3%. Based on the Table 6, the average gain score for improving student learning outcomes scores 56.2% in the Pretty Effective category or 0.56 in the moderate category.

Table 5: Descriptive Analysis of Pretest and Posttest Score Percentages

Code	*Percentage*	
	Pre-test	*Post-test*
Total Score	1270	2270
Average	42.3%	75.6%
Gain Score	33.3%	
N	30	

Discussion

The learning material on Behavioral Economics presented in this paper has been reviewed and validated by experts. Several revisions and improvements have been made, including updates to the learning implementation plan, teaching materials, and evaluation questions. These updates were made to align with the current knowledge needs of students, and to ensure that the material's novelty reflects students' daily experiences. The material's clarity, level of difficulty, and abstractness have also been revised to match the level of thinking expected from undergraduate students. The presented material is clear and interesting, and the examples and illustrations used are contextual and relate to students' daily experiences. This approach aligns with the contextual learning theory, which emphasizes the importance of relating material to real-world situations to motivate students to make connections between knowledge and its application.

Table 6. N Gain Score Results

Students	*Value/ Score*		*N-Gain*	*Category*	*N-Gain (%)*	*Interpretation of Effectiveness*
	Pre-Test	Post -Test				
1.	35	50	0.23	Low	23.08	Ineffective
2.	35	85	0.77	High	76.92	Moderate
3.	20	70	0.63	Moderate	62.50	Moderate
4.	35	75	0.62	Moderate	61.54	Moderate
5.	30	70	0.57	Moderate	57.14	Moderate
6.	40	65	0.42	Moderate	41.67	Less effective
7.	40	75	0.58	Moderate	58.33	Moderate
8.	45	75	0.55	Moderate	54.55	Moderate
9.	35	85	0.77	High	76.92	Effective
10.	30	85	0.79	**High**	78.57	**Effective**
11.	50	95	0.90	**High**	90.00	**Effective**

Students	*Value/ Score*		*N-Gain*	*Category*	*N-Gain (%)*	*Interpretation of Effectiveness*
	Pre-Test	Post -Test				
12.	55	65	0.22	**Low**	22.22	**Less effective**
13.	35	70	0.54	**Moderate**	53.85	**Less effective**
14.	55	85	0.67	**Moderate**	66.67	**Moderate**
15.	35	65	0.46	**Moderate**	46.15	**Less effective**
16.	55	80	0.56	**Moderate**	55.56	**Moderate**
17.	20	75	0.69	**Moderate**	68.75	**Effective**
18.	40	85	0.75	**High**	75.00	**Effective**
19.	50	75	0.50	**Moderate**	50.00	**Less effective**
20.	45	80	0.64	**Moderate**	63.64	**Moderate**
21.	60	75	0.38	**Moderate**	37.50	**Ineffective**
22.	45	75	0.55	**Moderate**	54.55	**Moderate**
23.	30	75	0.64	**Moderate**	64.29	**Moderate**
24.	40	95	0.92	**High**	91.67	**Effective**
25.	55	70	0.33	**Moderate**	33.33	**Ineffective**
26.	50	75	0.50	**Moderate**	50.00	**Moderate**
27.	35	80	0.69	**Moderate**	69.23	**Moderate**
28.	50	65	0.30	**Moderate**	30.00	**Ineffective**
29.	55	75	0.44	**Moderate**	44,44	**Less effective**
30.	65	75	0.29	**Low**	28.57	**Less effective**

The improvement of this lecture product includes: (1) the syllabus needs to be completed with curriculum documents, (2) the addition of theory to the Behavioral Economics teaching materials, namely the Theory of Reasoned Action and Theory of Planned Behavior, (3) case studies that stimulate students to think about the rationalization of decision making in Behavioral Economics and classical economics, (4) the size and layout of the images need to be adjusted to one another, (5) the uniformity of sample templates and illustrations in each chapter, and (6) providing instructions for using teaching materials. Based on material experts and learning media experts, product development is in the proper category.

The results of the effectiveness of the use of teaching materials can be seen from the pretest and posttest scores in the form of multiple-choice questions totaling 20 questions with five answer choices. The results show that the development of lecture tools is quite effective. The feasibility of product development is due to several factors, for instance students are able to understand the material in behavioral economics lectures, so that during the post-test they are able to answer the questions given. This is proof that the behavioral economics course developed can help students understand the material quickly, correctly, and precisely. In addition, the contents of the teaching materials are in accordance with the semester learning plan and learning objectives. Lastly, the examples and illustrations in the teaching materials have been well presented.

Based on the result, students are able to understand the material in behavioral economics lectures, so that during the post test students are able to answer the questions given. This is evidence that the behavioral economics course developed can help students understand the material quickly, correctly and precisely. (2) the suitability of the characteristics of students which includes cognitive aspects which include talent and level of intellectual development, psychological aspects which include interest and motivation with the learning design (syllabus) developed according to what was stated by Setyosari & Sulton (2003) that in order to maximize learning outcomes, learning needs to be well designed, so that learning runs effectively and efficiently. (3) the selection and development of teaching materials in accordance with learning objectives, in which the developed teaching materials are presented clearly and equipped with contextual examples and illustrations, so as to stimulate students to be able to think abstractly and critically in observing the real situation that is currently happening, besides In addition, students feel

interested in learning behavioral economics material which is new to their knowledge, so they feel happy when learning and (4) Learning design activities that are managed by applying the *Problem Based Learning learning* model through work sheet which contains case studies that lead to C4 and C5 thinking skills .

Finaly, the use of behavioral economics teaching materials has an effective effect on student learning outcomes and it can be stated that the use of behavioral economics teaching materials is quite effectively applied to students. A preliminary study explained that conditions of scarcity can influence human decision-making, both in the context of economics and everyday life, and the implications for designing more effective policies (Mullainathan & Shafir, 2013). This indicate that the essential of behavioral economics for the complex economic today. Indeed, Thaler and Sustein (2008) noted how behavioral economics principles can be used to nudge individuals to make better decisions in various aspects of life, including health, wealth and happiness.

Conclusion

This paper provides an assessment of the feasibility and effectiveness of the learning material in behavioral economics for higher education. Four experts validated the content, and 30 students participated in the experimental study. The results reveal that the learning material development was reviewed and validated by some experts and underwent revisions and enhancements. Based on the analysis, behavioral economics learning makes an impression on students. The student's impression is reflected through changes in perspective and thinking after studying behavioral economics, including a better understanding of their behavior and the behavior of other individuals in carrying out economic activities and decision making, giving students awareness that so far there have been several economic activities that they have carried out based on the assumptions contained in behavioral economics, and better understanding the impact of the economic decisions they make.

This paper has the implication of enhancing understanding of economic decision-making, in which behavioral economics introduces concepts and theories that challenge traditional assumptions of rationality in economic decision-making. As with other studies, this study also has limitations in terms of time and resource constraints. Limitations in time, funding, and access to relevant expertise or resources may impact the quality and scope of the learning materials that can be developed. In addition, the limitation of this study is that it solely considers the experiential study in a single time frame. Thus, future studies can conduct longitudinal studies to assess the long-term impact of the learning materials on students' understanding of behavioral economics concepts and their application in real-world scenarios.

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