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Family economics education and basic economics in shaping students' irrationality

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ABSTRACT

The COVID-19 pandemic has led to changes in consumption habits and irrational consumption, which also exhibit a strong tendency towards family economic education (FEE) in shaping student economic behavior and economic irrationality (IR). The novelty of this study lies in the exploration of the relationship between FEE and students' economic behavior mediated by basic economic (BE) understanding, which is still under-explored in the context of economic education in Indonesia. This study uses a quantitative approach with structural equation modeling (SEM). A total of 385 students of economics or economic education study programs are spread across 38 provinces in Indonesia. The finding of the research indicate that FEE has a significant but relatively weak positive effect on students' BE understanding. In addition, FEE directly increases students' irrationality, as well as BE understanding, which also turns out to contribute positively to such irrational behavior. This finding implicitly shows that the delivery of intensive FEE information does not always have a positive impact but can actually strengthen IR in students. Thus, this study emphasizes the need for a more careful and selective approach in FEE to reduce students' irrational behavior.

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1. INTRODUCTION

Recently, awareness of the role of sustainable behavior in addressing environmental challenges has grown. Falcone and Fiorentino [1] found that behavioral interventions like nudging effectively promote sustainable consumption, especially in circular bio-economy fashion. The study showed that environmental awareness, individual sense of responsibility for environmental sustainability, and one's political orientation significantly influence environmentally friendly consumption patterns. Understanding these psychological and social factors is important as an initial foundation in designing family economic education (FEE), which aims to reduce irrational economic behavior (IR) in students. Departing from this context, this study aims explicitly to integrate the role of FEE with basic economic (BE) understanding to encourage students' economic rationality in Indonesia [1].

Everyone must conduct buying and selling activities in their daily lives [2]. Trading activities are part of the economic activities of the entire community. In economic activities, people face various choices they must make [3]. Individual decisions are based on various goals; sometimes, these goals do not match their needs [4]. These decisions are more inclined towards fulfilling desires and ignoring that their needs have been met (chrematistics). This is contrary to the theory put forward by Aristotle that economic activity should be aimed at profit, not extra profit, for purposes such as Veblen's theory [5]. In facing these conditions, the important role of economic literacy is to encourage students to consider the decisions they will make [6], [7], especially regarding consumer, saving, and investment decisions that lead to thinking about the future [8], [9]. This condition is exacerbated by the post-COVID pandemic conditions that make students more comfortable with technology. The use of gadgets among students aims to be a source of educational renewal and learning opportunities [10]. However, ironically, during the pandemic and post-pandemic, gadgets are used more for consumer activities such as buying goods online.

Based on previous research results, the important role of economic literacy in accommodating more complex decisions is that mastering BE concepts would enable students to make better decisions in their economic behavior [11], [12]. Other research states that economic literacy can encourage students' intentions to engage in business [13], which will have a positive impact on students' financial behavior, which will later have an impact on their welfare [14]–[16]. However, the relationship between economic understanding and students' economic actions, including consumption and production, has received little attention from experts. Therefore, this research seeks to dig deeper into these two aspects and involves a behavioral economics approach to explain students' economic behavior.

Highlights of previous study summaries on the correlation between institutional quality, bioeconomic performance, and sustainable economic-ecological behavior are crucial. Research by Barra and Falcone [17] provides strong indications regarding this. The quality of an institution is a main cause in determining how the bioeconomy functions at a regional level, whether in governance or major institutional changes. The research also yields another implication, namely the potential to increase sustainability opportunities by maximizing economic and environmental technology resources to realize a complex bioeconomy. The development of the bioeconomy becomes a determinant for the creation of new jobs and positive competition in sustainable industries and their development. The presence of inputs, processes, and outputs is essential for sustainable economic success. The significant role of economic behavior in every sector of society and sustainable environments has become important today in line with the sustainable development goals (SDGs).

Recent research findings indicate the urgency of institutional quality determinants in improving environmental economic efficiency, especially in facing negative challenges such as greenhouse gas effects and waste. In addition, economic growth must also be maintained. Countries with upper-middle income levels tend to show higher environmental efficiency compared to lower-middle income countries, mainly due to better institutional quality. Therefore, institutional aspects such as political stability, government effectiveness, and regulatory quality are important factors that determine the extent to which a country is able to achieve economic and environmental sustainability. Furthermore, people's behavior in managing economic resources is also influenced by economic literacy obtained both formally and informally, for example, through family socialization and formal education in schools. Recent studies have shown that low economic literacy can cause individuals to tend to be consumptive and IR in making economic decisions, especially among students [18]. Therefore, quality economic education both in FEE and through formal education needs to be integrated effectively in order to reduce consumerist and IR among students. By considering this context, this study focuses on how economic education in the family environment and BE understanding can shape students' rationality, especially in Indonesia.

Based on the topic trends, there has recently been considerable research indicating that the transition to a sustainable economy is complex and involves many stakeholders. This is important because it concerns social and economic aspects. Significant impacts occur in related industries as it affects how they gain benefits and incur losses. More broadly, the majority of the literature on this topic develops progressively, stating that the integration of fairness concepts for producers and consumers is maintained. Producer behavior and consumer preferences and behavior are the initial impacts. Currently, there is indeed much research on the impact of sustainable economic innovation on social and economic inequality. This relates to the expansion of renewable energy application as a step towards sustainable industry, which under certain conditions may actually result in regional disparities.

The conditions occur differently in developed and developing countries. The most obvious example is Brazil, which is rich in natural resources. However, that is precisely the challenge. Abundant natural resources lead to high dependency, and if resource-based economic potential is damaged, the local economy can collapse. Therefore, a contemporary concept has emerged, called the multilevel perspective (MLP). This means that any strategy aimed at creating a sustainable economy must consider the potential of each region

and manage that potential well to avoid massive dependency. This has the potential to reduce inequality and ensure the smooth implementation of a sustainable economy. Identifying the characteristics of each region is a key factor [19].

The advanced concept related to the condition is economic policy uncertainty (EPU). The impact of this is a positive effect on sustainable economic environment performance. This is also reflected in previous research. Prevention through EPU functions to mitigate the negative effects of environmental efficiency on industry. In the context of developing countries, particularly in South Asia, the adaptation of environmentally friendly technology economics helps reduce economic and financial risks. The synthesis will return to the contribution of institutions. The quality of institutions is important to protect from political effects and to maintain good bureaucracy. The better the institutions and environmental regulations [20], the more effectively sustainable economic policies will be implemented. This conditioning must align with changes in societal economic behavior. One significant factor, both as subjects and objects, is the younger generation in determining the success of environmental policy programmed [21]. Therefore, the implications of several variables that have appeared in this research need to be studied for their effects to reduce irrationality.

In addition to MLP and EPU, an equally important aspect is transformative innovation policy (TIP). This serves as the spearhead of the SDGs. Policies that are highly innovative not only aid economic growth but also lead to sustainable economic development. This refers to global demands where society becomes subjects whose behavior must be optimized for policies to run smoothly. TIP differs from conventional policies because it emphasizes multi-stakeholder collaboration and is oriented towards comprehensive transformation results in various sectors, societies, and economies. Thus, TIP is able to provide significant impacts in addressing global socio-economic challenges more effectively than traditional approaches that tend to be incremental [22]. SDGs are needed from the quality education side, which in this study is focused on informal education in the family. The goal is to make students rational in economic activities.

Students' literacy can come from their environment, especially the environment closest to them, namely, the family environment [23], [24]. The family is a child's first educational environment, which will later help them become individuals who can make decisions, including consumptive or productive behavior [25], [26]. The quality of time spent with the family influences children's behavior and economic decisions [27], [28]. Families and parents propose a special educational approach for their children. This special educational approach can be realized in various ways, such as encouraging savings habits, emphasizing the importance of priorities, and stimulating creativity to create innovative ideas. The role of parents is crucial to support interdisciplinary learning that emphasizes problem-solving, creativity, and the application of practical skills in the real world, as is the case in science, technology, engineering, mathematics/science, technology, engineering, arts, mathematics (STEM/STEAM) learning [29]. Parents must also pay attention to the applications on their children's gadgets. They should be selective in determining the best applications for their children, such as educational or financial management applications [30], not online shopping applications or games. Parents' expectations regarding the knowledge their children gain certainly form a rational person in carrying out economic activities.

However, these studies tend to focus more on the impact of formal economic literacy in schools and have not yet explored in depth the position of FEE as a crucial determinant in the formation of students' economic behavior. Theoretically, there is still a gap in the integration between the theory of economic socialization in the family and the theory of individual economic behavior, where the family has not been positioned as the primary agent in the formation of children's economic values, habits, and preferences from an early age. To fill the gap between existing research and theory, this research seeks to evaluate the correlation between FEE and economic actions carried out by students in Indonesia. In addition, this study also investigates the role of BE as a mediator in this relationship. This study is expected to contribute significantly to the literature. First, it is hoped that this research can enrich the economic literature from a behavioral economics perspective, especially in explaining how the influence of FEE shapes students' economic behavior, which is not always rational. This aspect is still relatively under-explored in the aspect of economic education at the school level. Second, measuring economic behavior can evaluate a basic understanding of economics. One contribution from this research is aimed at the heads of higher education institutions to make students more rational in their economic activities. Lastly, Surabaya is unique in this study because it has the second most populous population after Jakarta, with diverse demographics. This provides a more comprehensive understanding of this problem and several suggestions for overcoming irrational student economic behavior.

In various progress towards building a sustainable economy that considers socio-economic aspects, recent findings are also quite diverse. For example, in China, a published study indicates that China focuses on strengthening student decision-making and its relation to economic and business studies. They recognize that risk management and rationality are key aspects that must be instilled, particularly through formal education via a structured process [31]. In general, university-level economics education programmed can directly improve students' economic competencies, with implications potentially extending to consumer

preferences and good financial management. This occurs in Germany [32], where students with higher economic competence tend to lead to effective financial management. Of course, this is also influenced by economic behavior in Europe. Another example comes from Switzerland, which focuses on an adaptive economic education curriculum according to regional uniqueness that can reflect local culture and different economic spirits, one of which is capitalist. Therefore, the conclusion reached is that students who can understand and respond to economic dynamics potentially have varying decision-making abilities [33].

The novelty of this research lies in the use of the BE variable as a mediator in the relationship between FEE and IR. Previous studies generally only examined the direct and indirect effects of FEE on IR [34]–[36], but did not explicitly discuss the concept of "irrational" within the framework of student behavioral economics. This study adopts a behavioral economics approach by emphasizing the importance of psychological and educational foundations in shaping economic actions. As far as the author's research, there has been no previous research that empirically tests the role of BE as a mediating construct that bridges FEE with student economic behavior.

This research offers several contributions to the literature on students' economic behavior. First, this study adds insight into the role of BE competence in the family sphere as a predictive factor in forming irrational economic behavior in students and preparing them to become productive individuals, which is rare and missing in previous studies. This study is important because BE competence in the family sphere can improve students of economic education study programs (prospective economic teachers) to become rational individuals in economic behavior. If they become economic teachers, they will also teach their students to become rational individuals in economic behavior. This is important because it will form a productive and non-consumptive human personality. Second, this study provides another perspective when the government considers making policies more efficient in providing subsidies in the form of money or goods to the community and focuses more on budgeting funds for micro, small, and medium enterprises (MSMEs), start-ups, and cooperatives to be more productive. Third, research in Indonesia is very different from that of other countries, and there is less research on BE competence in the family sphere to reduce irrationality among students. In addition, this study explores the relationship between BE competence in the family circle and student irrationality. This area has not been explored in the literature.

The central focus of this research design is to pinpoint the critical determinants that can support the development of FEE. In addition to identifying the key factors, this research hopefully can strengthen students' basic understanding of economics as a strategic effort to form a more rational consumption pattern. This approach aims to provide theoretical contributions and offers a practical basis for families and educational institutions to identify the shortcomings of existing FEE programs. These shortcomings will be identified from the results of this study and can be improved to make them more effective.

This research involves a concentrated search using a behavioral economics approach to economic behavior. In contrast, the neoclassical economic view asserts that individuals act rationally and seek maximum satisfaction. At the same time, the behavioral economics approach combines the aspects of economics and psychology to understand the reasons behind individual actions and decisions. This study aims to answer the scientific question: To what extent do FEE and BE shape students' economic decision-making and potential irrational behaviour? Therefore, the proposed hypothesis is as: i) FEE has a positive effect on BE (H1); ii) FEE has a negative effect on students' irrationality (H2); iii) BE has a negative effect on students' irrationality (H3); and iv) FEE has a negative effect on irrationality through the students' BE (H4).

2. METHOD

2.1. Types and approaches of research

This research employs a quantitative methodology with an explanatory research type. This approach is used because the study seeks to explain the causal relationship between FEE variables, BE understanding, and student behavioral irrationality. The proposed research model was evaluated through the structural equation modeling (SEM) approach with the help of the latest version of WarpPLS software, because it is able to handle models with formative indicators, non-normal data, and non-linear models efficiently. Another reason this approach was chosen is that it is able to test causal relationships with complex models between latent variables with a relatively small sample size. WarpPLS also allows testing of mediation models and provides robust results for non-normal data. However, this method has limitations in explaining causal relationships in depth without the support of longitudinal or experimental data. Furthermore, in terms of limitations of this study, the use of online questionnaire data can be influenced by respondent bias and limited access to populations that are not active on social media.

2.2. Research procedure

As presented in Figure 1, the research procedure consists of five main stages, namely: i) formulation of the problem and research objectives; ii) development of a questionnaire instrument based on the theoretical framework and previous research results; iii) distribution of the questionnaire online to selected respondents; iv) data processing using the SEM technique with the help of WarpPLS software; and v) interpretation of the analysis results and drawing research conclusions.

At the instrument development stage, a systematic literature review was conducted on FEE, BE understanding, and irrational behavior, which was then used as the basis for compiling statement items. Expert validation was also involved to ensure the suitability of the instrument content with the construct being measured. The questionnaire was distributed using the proportional random sampling technique so that each province in Indonesia could be represented proportionally. Data analysis was carried out using the SEM approach through WarpPLS software, which allows for comprehensive estimation of the relationship between latent variables. The final stage is the interpretation of the analysis results, which are linked back to the theory, so that meaningful findings are obtained both academically and practically in the context of economic education and student behavior.

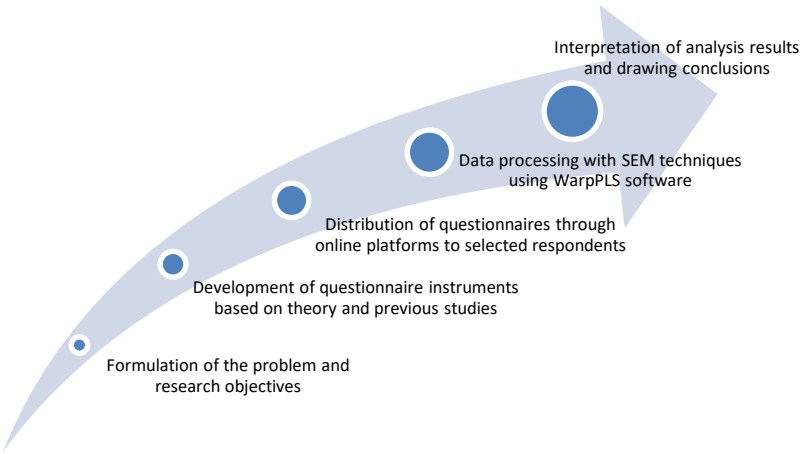

Figure 1. Research procedure

2.3. Data

This research data was collected online using a Google Form distributed via WhatsApp, Telegram, Facebook, X, and Instagram. The use of social media as a method of distributing questionnaires is considered relevant, considering the high level of internet penetration and active use of social media among Indonesian students. In addition, social media allows researchers to reach a geographically widespread population more quickly, thereby increasing the representation of the sample nationally. However, this approach has limitations in the form of the possibility of accessibility bias, because not all students are active on social media or have a stable internet connection. To maintain data representativeness, respondents were randomly selected from the contact list of students who actively participate in forum or social media groups specifically for economics or economic education students in each province. Thus, the use of social media in this study is considered capable of providing a representative sample to evaluate students' economic behavior effectively, especially in the context of the geographical spread of respondents throughout Indonesia. This quantitative research approach uses survey methods to explain the causal connection between FEE and IR through students' BE.

The data source for this research comes from instruments in the form of questionnaires. The FEE variable was modified from several researches [37]–[39], using Likert scale with answer choices ranging from 1 to 5, from strongly agree to strongly disagree. Indicators of FEE include socialization, habitat, and role models. BE variables are test questions adopted from Walstad *et al.* [40] with a score measurement of 0-100. Indicators of BE include city, sustainable choice of productive resources (SCPR), decision-making, marginal analysis, supply and demand (DMMASD), economic systems and allocation mechanisms (ESAM), economic incentive prices, wages, and profits (EIPWP), voluntary exchange and trade (VET), specialization and comparative advantage (SCA), markets and prices (MP), competition (COM), economic institutions (MI), money and inflation (MOI), labor markets and income (LMI), entrepreneurship and entrepreneurship (ENT), physical and human capital investment (PHCI), the economic role of government (ERG), and unemployment and inflation (UI). Finally, the irrationality variable adopts research from Wahyono *et al.* [41] using a Likert scale with answer choices ranging from 1 to 5 (strongly agree to strongly disagree). Indicators

of irrationality include loss aversion (reluctance to lose), the endowment effect (perception of items owned versus items not owned), herd behavior (group behavior), altruism, and economic morality.

This research instrument has also received validation from expert lecturers in the field of economic education in Indonesia. After receiving validation from experts, we tested the instrument on 50 respondents to determine the validity and reliability test using SPSS software. Two question items were invalid from this activity because the Cronbach alpha value was less than 0.7, so we discarded them with the note that there were still question items representing each indicator. Thus, all the instruments we used for the study met the requirements because the Cronbach alpha value was above 0.7. Finally, to fulfill ethical clearance, which arises from underreporting of opinions, we first informed them that the survey was for academic purposes only, and we assured respondents that the information would be kept confidential.

2.4. Population and sample selection

The population in this study was active students of the economics and economic education study programs in all provinces in Indonesia, spread across 38 provinces. The sample in this research was ten times the formative indicators for the variables with the most indicators [42]. This variable is BE, with 29 indicators; therefore, the minimum sample size was 290. However, based on the sample calculator software, if the population size were unlimited and the margin of error was 5%, the minimum sample size should be 385 respondents. The sampling technique used was proportional random sampling to show the representativeness of the population [43], [44]. The number of respondents was determined proportionally, namely by determining the number of respondents proportionally from each province based on the distribution of economics or economic education study programs in the region. As an implementation, 10 respondents were randomly selected from each province as a proportional representation. For West Java Province, the number of respondents was increased to 15 people because this province has the largest number of students in economics and economic education study programs in Indonesia. The 15 respondents were obtained from three types of universities: state universities, private universities, and teacher training institutions (LPTK) and non-LPTK. The selection was carried out randomly based on a list of active students obtained from study program contact data, student organizations, or provincial-level economics student communication forums.

2.5. Data analysis

Before discussing further data analysis, the research conceptual model will be displayed first. Figure 2 helps to understand the relationship between variables to make it simpler [45]. The process of compiling this research conceptual model is the same as formulating a hypothesis, namely, based on the literature review [45]–[47]. Based on the literature review, the conceptual model was obtained in Figure 2.

This is a research data collection method. The research employed SEM as the primary analytical method, with WarpPLS used to assist in model estimation, with model specification and the outer and inner model stages. Later, it will be explained in more detail, namely, the goodness of fit to measure the model and the variable profile for measuring confirmatory factor analysis (CFA). Lastly, hypothesis testing for direct and indirect effects will be carried out. The data was analyzed using the SEM approach with the WarpPLS application.

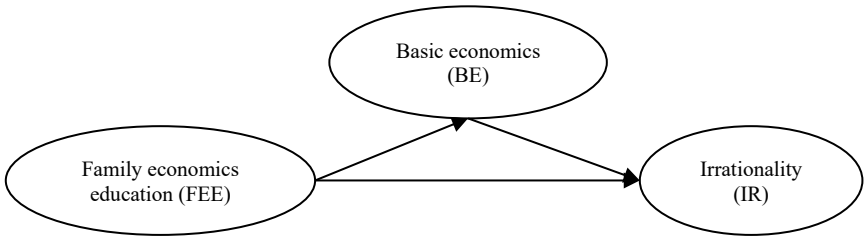

Figure 2. Research conceptual model

3. RESULTS AND DISCUSSION

3.1. Results

The goodness-of-fit test results show that the relationship models between the variables built in this research all meet the criteria. The requirements for the model to meet the fit criteria depend on the research objectives. If the research objective is to find the best model, all the fit criteria must be met [48], [49]. However, this research aims only to look for influences and not for the best model so that the research can continue if one or two fit criteria are met [50], [51]. The goodness of fit test results is shown in Table 1.

Table 1. The goodness of fit

No.	Model fit and quality indices	Fit criteria	Results of analysis	Information
1	Average path coefficient (APC)	P<0.05	0.235 (P<0.001)	Meets the requirements of the fit model
2	Average R-squared (ARS)	P<0.05	0.115 (P=0.027)	Meets the requirements of the fit model
3	Average adjusted R-squared (AARS)	P<0.05	0.108 (P=0.033)	Meets the requirements of the fit model
4	Average block variance inflation factor (AVIF)	Acceptable If <=5, ideally <=3.3	1.006	Ideal
5	Average full collinearity VIF (AFVIF)	Acceptable If <=5, ideally <=3.3	1.139	Ideal
6	Tenenhaus goodness of fit (GoF)	Small >=0.1, medium >=0.25, large >=0.36	0.198	Small
7	Sympson's Paradox ratio (SPR)	Acceptable If >=0.7, ideally =1	1.000	Meets the requirements of the fit model
8	R-squared contribution ratio (RSCR)	Acceptable If >=0.9, ideally =1	1.000	Meets the requirements of the fit model
9	Statistical suppression ratio (SSR)	Acceptable If >=0.7	1.000	Acceptable
10	Nonlinear bivariate causality direction ratio (NLBCDR)	Acceptable If >=0.7	1.000	Acceptable

In Table 1, the results of goodness of fit for the ten criteria produced can be seen. Almost all of the 10 criteria have met the requirements for passing. However, one criterion falls into the small category, namely goodness of fit (GoF). The Tenenhaus GoF index is designed to assess the explanatory power of a partial least squares-SEM (PLS-SEM) model. It is one of the traditional criteria used to evaluate model fit in PLS-SEM [52]. Thus, the acceptability of GoF values depends on the research context and the particular threshold the researcher sets. There is no universal threshold for what constitutes a "good" GoF value, but it is often used as a comparative rather than an absolute measure [52]. However, this study aims only to find the influence between variables and not to find the best model so that this is not a problem [53], [54].

The discussion in Table 2 contains a load factor, which indicates that the higher it is, the more significant the contribution to the variable or the more important the indicator is [55]. The following data set is the average score, which indicates the empirical conditions felt by the respondents. Both data are compared. If the load factor is high but the average score is low, then the advice is to fix it immediately. However, if the load factor is low and the average score is high or low, then the advice can be maintained or ignored, and the important indicators can only be focused on.

When the factor loading is more significant, the indicator increasingly reflects or becomes important for that variable. The important indicators of the several variables in this research include: i) the FEE variable, an important indicator, namely socialization, has a factor loading of 0.852 with a high condition; therefore, it must be immediately increased or improved until it rises to a substantially high level and ii) the IR variable with an important indicator, namely the endowment effect (perception of items owned versus items not owned), has a factor loading of 0.709 with a high condition, thus it requires prompt increased/improved to a very high condition.

Table 2. Variable profile

No.	Variable	Indicator	Load factor	Average score	Suggestion
1	FEE	Socialization	0.852	4.1 (high)	It needs to be repaired immediately
2		Habit	0.826	3.8 (high)	It needs to be repaired immediately
3		Role model	0.629	3.7 (high)	Maintained
4		Loss aversion (reluctant to lose)	0.660	3.4 (high)	Maintained
5	IR	Endowment effect (perception of items owned versus items not owned)	0.709	3.8 (high)	It Needs to be repaired immediately
6		Herd behavior (group behavior)	0.244	3 (high)	Maintained
7		Altruism	0.529	3.1 (medium)	Maintained
8		Economic morality	0.571	3.7 (high)	Maintained

3.1.1. Hypothesis testing

The hypothesis testing in this study is divided into two, namely direct effect and indirect effect. Direct effect is used to answer the exogenous influence on endogenous variables without mediation [56] in hypotheses 1, 2, and 3. In comparison, the indirect effect is used to answer hypothesis 4. Data analysis with WarpPLS software produces two outputs: images and tables. The direct influence between variables can be seen in Figure 3.

Figure 3 shows the result of the original data analysis issued by the WarpPLS software. It can be seen that FEE has three indicators symbolized by 3i, BE 30 test questions symbolized by 30i, and IR has three indicators symbolized by 5i. There is also a summary of the influence between variables marked with P=, which means the p-value value. Finally, there is also a summary of the results of the relationship between variables marked with the coefficient (β), which, if (+) then has a positive relationship, and (-) if the relationship is negative [57]–[59].

As mentioned earlier, in addition to producing figure output, WarpPLS produces output as a table. Table 3 describes the relationship between variables directly. The information obtained from Table 3 compares the p-value with alpha 1%, 5%, and 10%. This study uses the three alpha types as a basic reference for making hypothesis decisions. If the p-value is smaller than alpha, there is a weakly significant, significant, and highly significant influence [60].

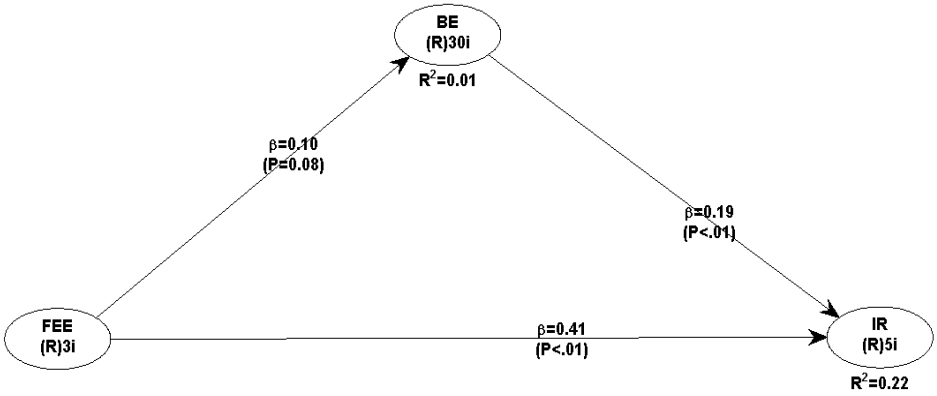

Figure 3. Research conceptual model

Table 3. Relationship between variables

No.	Relationship between variables			Path coefficient	P-value	Description
1	FEE	→	BE	0.100	0.080	1
2	FEE	→	IR	0.410	<0.001	2
3	BE	→	IR	0.190	<0.001	3

Based on Table 3, it is known that the influence of FEE on BE has a path coefficient of 0.100 and p<0.080. Considering that the p-value is smaller than 0.1, it means that it is weakly significant; therefore, the hypothesis 1 (H1) is accepted. Although the p-value is above the conventional significance threshold of 0.05, it is still within the tolerance limits of significance, especially if using a significance limit of 10% (α=0.10) [61] as is sometimes used in the social sciences. Furthermore, FEE has an effect on IR with a path coefficient of 0.410 and p-value <0.001. Based on calculations, it can be seen that the relationship between FEE and IR has a p-value <0.001, indicating that there is a very significant influence. The path coefficient has a positive sign (0.410), indicating that the higher the FEE, the more IR. Thus, the hypothesis 2 (H2) was rejected. This finding is not in line with the direction formulated in the initial hypothesis, which states that the effect of FEE on IR is negative. Nevertheless, this result still shows a strong and significant positive relationship between FEE and IR, thus indicating a different direction of the relationship from the initial expectation. Further explanation regarding the different direction of this relationship and its implications will be discussed in the discussion section.

Finally, the effect of BE on IR had a path coefficient of 0.190 and a p-value of <0.001. Based on the calculations, it can be seen that the relationship between BE and IR has a p-value <0.001, indicating that there is a highly significant influence. The path coefficient has a positive sign (0.190), indicating that the higher the BE, the higher the IR. Thus, the hypothesis 3 (H3) was rejected.

The results of the data analysis from the next WarpPLS software are the indirect effect. This analysis determines the indirect effect between FEE and IR [62]–[64]. Table 4 will show whether BE has succeeded in becoming a mediating variable. Table 4 shows the indirect influence between the variables. It becomes apparent that the relationship between FEE and IR through BE has a coefficient of 0.019 with a p-value of 0.355. Thus, BE is not a mediator variable. Thus, the hypothesis 4 (H4) was rejected.

Table 4. Two segment-mediation

No.	Explanatory variable	Mediation variables	Response variables	Indirect influence path coefficient	P-value	Description
1	FEE	BE	IR	0.019	0.355	Not a mediation

3.2. Discussion

The main objective of this research is to test the relationship between the role of FEE and IR, and to confirm the role of BE. Hypothesis testing shows that FEE has a positive and weakly significant impact on BE, with a coefficient of 0.100 and p=0.080 on BE. Thus, it can be interpreted that there is a weak positive relationship between the FEE and BE variables, indicating that an increase in FEE tends to be followed by an increase in BE. This increase is in accordance with the Family Financial Socialization Theory, which emphasizes the impact of family interaction on financial outcomes. Parental financial socialization significantly influences financial literacy, behavior, and well-being in adulthood [65], [66]. However, the influence of FEE on BE in this study, the strength and certainty of its influence are relatively low. Therefore, these results remain relevant to consider in developing the model, but need to be studied further with a stronger approach or sample.

The finding that FEE has a positive but weak influence on BE confirms that informal education from families is not yet fully effective in instilling a strong understanding of economics in students. This finding follows the research results of Ali *et al.* [67] who reported that parental involvement in children's education is an important factor related to children's socio-emotional and educational outcomes. Even though the influence is weak, families can foster their children's BE understanding outside school [68]. The process of economic socialization, through which children learn economic concepts and behaviors, is strongly influenced by parental practices and the family's socioeconomic background. Parental involvement in financial education, although not constantly well developed, is crucial to improving children's financial literacy [69]. The effectiveness of family influence on economic understanding may vary by socioeconomic status. Children from lower socioeconomic backgrounds tend to receive less comprehensive financial education from their parents than those from higher socioeconomic backgrounds [70]. Discussions about financial economics between parents and children are one method of financial socialization, but their direct impact on financial behavior and well-being is still limited when compared to learning through modeling and experience [71]. We also cannot generalize this finding because parents' educational backgrounds are different. This influence is also due to their parents' educational background; some are highly educated [72], [73], and some are entrepreneurs who can pass on practical knowledge to their children. Parents' higher education can help a child's basic theoretical understanding of economics. Parents with an entrepreneurial background can help children understand economics both practically and empirically. Parents are the main actors in children's informal education [74]. The informal learning they receive from parents contributes to developing children's skills and knowledge, growth, and culture [75].

In connection with the second hypothesis, FEE influences IR. Hypothesis testing shows that FEE has a positive and significant influence on IR, with a coefficient of 0.410 and $p<0.001$, so the hypothesis is rejected. This finding challenges the assumption that the more economic socialization from parents, the better the child's economic rationality. This can be explained by the reactance theory, which has been applied to understand student rejection of syllabus policies. Policies that are considered controlling or unfair can increase reactance, thereby reducing compliance and engagement [76]. Thus, excessive pressure or advice can actually cause psychological rejection from children of the values conveyed and ultimately create an irrational personality.

Practically, these results also suggest that the formation of rational economic behavior is not enough through economic knowledge, but also needs to pay attention to psychological and emotional approaches in family education [77]. Therefore, in the context of educational policy, it is important to integrate behavioral economic approaches into the curriculum of economic education, both formal and informal, to overcome cognitive biases such as overconfidence [78], [79] or loss aversion [80]–[82], as reviewed by Kahneman and Tversky in prospect theory [83], [84]. In a broader scope, this finding is also relevant for the development of sustainable financial behavior. Economically rational students are more likely to make wise consumption and investment decisions, which support the national economic sustainability agenda [22]. Thus, efforts to improve the economic rationality of the younger generation should be part of a sustainable education strategy that combines financial literacy, emotional intelligence, and environmental awareness.

This result is in accordance with Fletcher and Kim [85] research findings, which state that family interactions and dynamics play an important role in shaping children's personality and IR thinking. The education that a child receives begins with the family. Children experience changes after they get to know the outside world, such as playmates and school friends outside the family [86].

The findings also support the results of Guttmann research [87], which states that young adults whose parents are married have higher scores in the tendency toward IR beliefs than divorced parents. However, in families, parents do not play an important role in shaping children's IR. The sibling also played an important role. This is in accordance with research by Fletcher and Kim [85], who state that siblings can influence children's development through competition for resources or beneficial interactions, behavioral modeling, and kinship care. Having additional siblings during childhood can cause significant differences in adult personality traits, potentially harming various aspects of life [88]–[90]. Family dynamics, including sibling interactions, parenting behavior influenced by household chaos, and parental education, can shape children's IR thinking. However, it is important to note that family influence is not the only determinant of a child's IR, as individual qualities and environmental factors also play an important role [91].

The key finding in this study lies in the socialization of economic education carried out by parents for their children. Socialization is an important indicator of FEE. The empirical conditions of socialization are high, but this is the most significant contributor to children becoming irrational. This is in accordance with the results of Al-Habies research [92], which states that there is an increase in the level of IR ideas among social science students, indicating a potential relationship between socialization and irrational beliefs. This could also mean that the socialization carried out by parents, for example, the advice about managing finances, is not necessarily what the children want. This results in a negative mood for children and can lead to IR [93]. Parental socialization is unwanted for children because of many factors, one of which is their preferences for content and delivery, which vary based on socioeconomic factors, children, and parenting patterns [94]. Therefore, proper FEE is needed in accordance with the interests of the child's generation so that they can become rational individuals and not irrational [95].

This study also reports that BE positively and significantly influences IR. Hypothesis testing shows that BE has a positive and significant influence, with a coefficient of 0.190 and $p<0.001$ on IR, so the hypothesis is rejected. Economic knowledge is obtained from formal education. The forerunner to the emergence of economic knowledge is scarce because of human inability to manage resources [96]. BE knowledge can make people more selective in prioritizing needs over desires [97]. However, there is debate about whether there is a difference between wants and needs. The initial opinion states that needs are more important than desires, so that humans can survive according to empirical conditions [97], [98]. Some argue against the existence of a distinction between needs and wants. This is due to the opinion that needs are not just instrumental resource requirements, but can be a valuable goal of human life [99]. It should be noted that desires usually correspond to significant needs but can sometimes be separated from needs in maladaptive ways, such as addiction and impulse control disorders [100]. The assumption that wants and needs are the same can make humans irrational [101]. In addition, by achieving desires, a person feels prosperous [102]. An important indicator of IR is the endowment effect. This means that students were satisfied with the items they had. Someone with the endowment effect would appreciate their goods or work rather than those of others. If he has a business, he will be objective when assessing competitors. Finally, if students want to become rational in consuming, they should consider input or reviews from other people regarding the goods they will buy [103].

Referring to research findings that BE has a massive influence on the IR of economics education students, it can be interpreted that the economic rationality ingrained in students' minds is not only the result of classroom learning, but also the internalization of economic values from social contexts such as family and friendships. This aligns with the findings of Giudice and Morone [104], who indicate the need for a transformation of the post-COVID-19 economic system through continuous innovation that is based not only on financial regulations, but also on changes in how individuals understand and respond to socio-ecological challenges. In other words, field practices involving social aspects also have an influence beyond formal education. Therefore, increasing BE literacy among students is not only important for rational financial decision-making, but also becomes the foundation for encouraging sustainable and environmentally conscious economic behavior, in line with the goals of the transition to sustainable finance and sustainability-oriented development [104].

This finding initially appears to contradict the traditional assumption in neoclassical economic theory, which states that good economic knowledge should lead to more rational decision-making behavior [105]. However, in the context of behavioral economics, this result is in line with the overconfidence effect phenomenon that is widely discussed in the behavioral economics literature [105]–[107]. In the long term, FEE plays a role as an initial foundation in forming a rational framework of thought, which tends to last until students become adults and independent if supported by a consistent formal educational context. This finding aligns with research results stating that individual economic behavior is influenced by parenting and learning patterns from an early age [36], [108]. It is also worth highlighting that habits are important in creating sustainable, rational decisions [109], [110].

Another long-term impact is that FEE not only influences individual economic decisions directly but also forms a decision-making resilience [111], which is the ability to withstand social pressures and environmental biases that can encourage IR [112], [113]. Students who receive consistent FEE show a lower tendency towards biases such as loss aversion and status quo bias, even when they face situations of economic uncertainty in the long term. Thus, the impact of FEE is not temporary but instead functions as a basis for the formation of rational thinking patterns that are self-reinforcing [114], [115].

However, these results also highlight that the long-term impact of FEE may be reduced if it is not supported by formal education oriented towards practical economic understanding [116]. BE understanding through formal education has an important role in broadening horizons and providing a theoretical context that complements family economic experiences and their understanding in the long term [117], [118]. In the long term, this integration of formal and informal economics education allows students to fill gaps in their education. It is necessary to navigate the complexities of the modern economy [119].

However, these long-term effects are not universal. This study identified that students who are in less supportive social environments, such as communities with excessive consumption or cultures that tend to be materialistic, are at higher risk of returning to patterns of irrationality [120] despite having a good foundation of FEE [121], [122]. This indicates that the impact of FEE is dynamic and highly dependent on environmental context.

This study contributes to the literature by highlighting the importance of FEE and BE understanding in building students' long-term rationality. However, further research with a longitudinal approach is needed to measure more deeply the extent to which this impact persists in later life phases, such as when students enter the workforce or start a family. Thus, this study opens up space for further exploration of how economic education and BE understanding can be a key strategy in reducing economic IR systemically in the long term.

This study also examined the mediating role of BE in explaining the influence of FEE on IR. Hypothesis testing shows that BE does not moderate the effect of FEE on IR, with a coefficient of 0.019 and p=0.355; thus, the hypothesis is rejected. This means that the most important thing to make students rational is FEE, followed by BE. To make students rational, they do not have to have a good BE first, even though it directly influences IR. Education is closely related to producing specific subjectivities and identities that can help students develop rational personalities [123], [124]. Informal education is needed because students can form knowledge and behavior, such as acting rationally, if they obtain a suitable FEE [125], [126]. Meanwhile, in terms of formal education, students must also take it if they want to become rational individuals [127] characterized by a high understanding of BE.

The dominant collectivist culture in Indonesia can influence how individuals make economic decisions [128]. More specifically, socio-cultural values and norms that emphasize family values create a favorable environment by maintaining socio-emotional wealth in family businesses. In traditional societies, where family governance is more export-oriented than in secular-rational societies, it forms productive individuals rather than consumptive individuals [129]. Family financial socialization, which includes discussions, habits, and exemplary behavior, plays an important role in shaping students' financial behavior, such as saving and budgeting. This socialization process helps students develop positive financial habits and attitudes despite lacking formal economic literacy [130].

Psychological factors such as attitudes, habits, and perceptions toward money may also explain why BE understanding does not mediate this relationship. Family experiences often shape attitudes toward money early on, such as being taught by parents to save, making them rational individuals [131]. In addition, family financial socialization practices, such as direct parental teaching and openness about family finances, are associated with favorable financial outcomes such as higher self-control in spending and lower financial anxiety [132], [133].

The socioeconomic conditions of students' families may also influence these outcomes. Students from low-income families may primarily focus on basic needs or survival by demonstrating prudent financial behavior, such as paying off debt promptly and focusing on essential needs [134]. Thus, they rely more on practical teachings from their families to manage their financial resources than on teachings from formal education [135], [136]. In contrast, students from high-income families may have direct access to financial resources without the need to understand or apply BE principles [137], [138]. In both cases, BE understanding does not play a significant role in shaping their financial behavior.

The results are paradoxical and contradict the traditional assumption in neoclassical economic theory, which states that increased economic knowledge should lead to more rational decision-making. Instead, these results support the literature in behavioral economics, which suggests that greater knowledge does not always eliminate cognitive biases but sometimes actually strengthens them [139], [140]. This also supports an overconfidence effect, where individuals with greater knowledge tend to feel overconfident in decision-making [141]–[143]. This overconfidence can lead to ignoring important information or taking greater risks than the excess knowledge they have, resulting in behavior that appears irrational.

In addition, the influence of economic values obtained from the family can also contribute to student IR. FEE that emphasizes too much on certain principles, such as extreme savings or a strong belief in market stability, can create a mindset that is not flexible enough to adjust to empirical conditions [144], [145]. This can prevent students from considering situational contexts or new information, resulting in decisions that appear suboptimal. In this context, FEE is not only a source of knowledge but also a deep bias former.

However, it is important to note that the concept of IR itself needs to be reviewed more critically. Information about IR is obtained in orthodox economics learned in formal education. It is an adaptive response to the complexity and uncertainty of the real world today. For example, students may make irrational decisions from an economic perspective. However, they reflect cognitive limitations and attitudes towards risk or survival strategies in their current environment [146].

Concretely, FEE and BE among students are influenced by several factors not explained in this research due to their complexity and wide implications. Some of these determinants include socioeconomics, family economic education, and access to good economic education. These three aspects are crucial for understanding economic behavior and managing finances to minimize student irrationality. Meanwhile, access to economic education materials at or outside school also influences students' understanding of BE concepts, which impacts their rational mindset. The interaction between these factors must be comprehensively understood to design the best model to minimize students' IR in economic activities.

The findings of this study have two ramifications. These ramifications require more effort, cost, and time to make students more rational in their economic activities. First, synergy is needed between universities, local governments, and students' parents. This synergy is carried out to educate parents of students so that they get the right sources and materials related to economic education, which will later be shared with their children. Second, major curriculum changes are needed in universities. Each course must be accompanied by material about the rationality between needs and wants. It is strange if students who graduate from the economics faculty actually become IR individuals in economic activities. Of course, this heavy task is borne by universities, especially the faculty of economics, so that they can provide a good example to other faculties.

The results of this study have several important implications for the field of economic education and the wider community. Theoretically, this study enriches the literature and develops theories related to FEE and BE. It shows that although FEE can increase BE, it is not enough to reduce students' IR behavior. This finding challenges the assumption that increasing economic literacy, in this case represented by BE, will automatically result in more rational economic decisions. Practically, the results of this study provide insights for parents and educational institutions in Indonesia. Parents are expected to be wiser in socializing economic education to their children, focusing on quality rather than quantity of socialization. Educational institutions, especially universities, need to develop curricula that improve BE understanding and teach critical thinking skills and emotional management to reduce IR. For the wider community, this study highlights the importance of a holistic approach to economic education that considers psychological and social factors. In the future, the results of this study can help design more effective educational programs to form rational and responsible individuals in making economic decisions.

Based on these results, this study provides specific recommendations for educators by giving project assignments to students that involve interaction with their parents. This also needs to be supported by policymakers who should develop project-based curricula that involve interaction between students and their families. This interaction is expected to support students' economic understanding from the formal education side in higher education and informally in the family to form rational student economic behavior.

4. CONCLUSION

This study provides an important contribution to enriching the literature on economic education and the economic behavior of students in Indonesia through three main findings. First, this study shows that FEE has a positive, albeit weak, influence on BE. This suggests that economic interactions within the family, although not dominant, still play a role in shaping the foundation of students' economic understanding. Second, a rather surprising finding is that the more intensive economic socialization in the family, the higher the tendency of students to exhibit irrational behavior. These finding challenges conventional assumptions and reveals the complexity of the dynamics of informal economic socialization that does not always produce a positive effect on economic rationality. Third, the results show that BE understanding does not mediate the influence of FEE on IR. This indicates that psychological, social, and cultural contextual aspects may play a more significant role in shaping students' economic behavior than formal conceptual understanding.

The practical implications of these findings include the need to develop a more contextual and needs-based FEE strategy for the younger generation. Educational interventions should not only focus on the intensity of socialization, but also on the quality of the material, an approach which is in accordance with the

psychology of the younger generation and sensitivity to socio-economic factors. In terms of policy, the results can be a basis for the government, higher education institutions, and family development institutions to develop a more integrative economic education curriculum that is oriented towards rational decision-making. Educational policies need to include a cross-disciplinary approach, which includes aspects of psychology, sociology, and behavioral economics, in order to answer the complexity of contemporary economic challenges, including encouraging sustainable financial behavior among the younger generation.

This study also underlines the importance of aligning informal economic education from families and formal education from universities to create synergies that encourage rational, efficient, and sustainable economic behavior. In a broader context, this can support the transition agenda towards a low-carbon and socially inclusive economy, in line with the SDGs, especially in the aspects of financial literacy, sustainable consumption, and reducing inequality. However, this study has several limitations. First, the scope of the sample is limited to students from the economics and economic education study programs, so that the generalization of the research results needs to be done carefully. Second, the data were obtained through self-reports, which have the potential to cause perception and representation bias. Third, the cross-sectional research design has not been able to capture the long-term dynamics and causality between variables. To overcome these limitations, future research is suggested to use a longitudinal or experimental approach, involving students across study programs and universities, and adding new variables such as mental health, in-depth family dynamics, and the influence of digital media. In addition, exploration of the relationship between economic education and sustainable economic behavior, including in the context of sustainable finance, is an important agenda that can enrich academic and practical understanding in economic education.

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AUTHOR CONTRIBUTIONS STATEMENT

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C : **C**onceptualization
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O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

As the authors, we declare that this research is not related to any financial, personal, or professional interests that could influence any aspect of this study.

INFORMED CONSENT

We as the authors inform that consent from all individuals involved in this research has been obtained, ensuring that this study protects the privacy and rights of the respondents. Furthermore, all participants have granted permission for the use of their personal information in accordance with research ethics standards.

ETHICAL APPROVAL

This research involving human participants adhered to all relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration. Ethical approval was granted by the institutional review board of LPPM Universitas Negeri Surabaya under the approval number 0018/UN38.III.1/DL.01.02/2024. Participants were informed that the study was conducted solely for academic purposes, and their confidentiality was strictly maintained. Additionally, the researcher did not intervene with the respondents, ensuring the integrity and ethical conduct of the study.

DATA AVAILABILITY

Derived data supporting the findings of this study are available from the corresponding author, [AFP].

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