

Original Article

Explaining Medical Students' Experiences Regarding Components of Educational Justice in Medical School

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Educational justice, Medical sciences, Medical students, Education, Medical education

Abstract**Introduction:** Educational justice is one of the emphasized topics in the WFME standards for accrediting general medical education. In addition to influencing policymaking and academic management, it affects health outcomes and patient care. Despite this importance, studies related to this area are limited. Therefore, this study aimed to explain the perspectives and experiences of medical students regarding educational justice in medical schools.**Methods:** The current study was conducted using a qualitative content analysis approach to explain the perspectives and experiences of medical students regarding educational justice. The participants in the study were general medicine students selected using purposive sampling. The data collection tool consisted of 12 semi-structured interviews. The data were analyzed using the conventional content analysis proposed by Hsieh and Shannon.**Results:** Data analysis revealed 60 initial codes, 19 subcategories, and 8 categories for educational justice. The categories included: educational justice from the student's perspective; the flow of justice in education; inclusive and equitable education; fair interactions and behaviors; access to fair opportunities; fair arrangement of professor distribution; fair access to educational and welfare facilities; Causes and obstacles to educational injustice.**Conclusion:** The present study showed that the students conceptualize educational justice not merely as equity, but as an interplay between equality, equity, and structural justice. In addition, increasing student capacity, issues related to resource provision, and limited resources and facilities are among the most important reasons for injustice in the educational system.**Introduction**

Today, the concept of educational justice is highly prominent in academic environments, especially in universities, to the extent that the existence of fair conditions and adherence to principles and rules of justice can lead students toward civil educational behaviors. Moreover, the perception of justice alleviates individuals' doubts and concerns about the violation of their rights and freedoms.^{1,2} Thus, the issue of educational justice has garnered attention in recent years and has been examined from various aspects; however, it has received less focus in the field of medical sciences. Additionally, differences among students in various aspects create variations in educational needs and a set of questions in this field.³

Educational justice in medical education refers to the fair organization of educational opportunities, resources, interactions, processes, and institutional arrangements in ways that recognize equal rights of

students while appropriately responding to differences in their needs and circumstances. Although equality, equity, and justice are closely related concepts, they are not synonymous. Equality refers to providing students with equal rights, opportunities, resources, or treatment without discrimination. Equity recognizes that students may differ in their needs, circumstances, and barriers and therefore may require different forms or levels of support to achieve fair opportunities. Justice represents the broader principle of fairness that encompasses the identification and addressing of individual, institutional, and structural conditions that may result in unfair educational experiences or outcomes. Thus, equality and equity represent related but distinct ways through which fairness may be pursued, whereas educational justice is used in this study as the overarching construct encompassing these dimensions.⁴ Accordingly, the term educational justice is used throughout the current study

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as the overarching construct, while equality and equity are used only when referring specifically to these distinct dimensions of fairness.

For instance, some researchers have proposed that conducting exams and assessing academic achievement is one of the fundamental pillars for promoting and developing educational justice.⁵ Furthermore, many students consider educational justice to be related to assessment; however, numerous studies have shown that most students complain about inappropriate assessment methods by professors.⁶ Given that assessment is a multidimensional process through which skills and the quality of education evolve,⁷ unfair assessment has psychosocial effects on students. Additionally, their values and social norms will be affected.⁸ Nevertheless, according to sources, some of the current tests do not fairly assess students and cannot adequately distinguish between weak and strong students.⁹

In several studies, educational justice has also been linked to professors' behavior towards students, particularly in classes where there is significant disparity among students.⁹ In this view, educational justice begins with respect for the personality and individuality of the student, a point acknowledged by professors but may be overlooked.¹⁰ This form of justice pertains to interactions, behaviors, and functions based on fairness; impartial approaches, guidance according to students' abilities, and fairness in ranking and evaluating students.¹¹ However, some believe that a friendly relationship between professors and students can influence evaluations.¹² Various professors, with different experiences, ideas, and criteria, can lead to unequal evaluations.¹³ Various studies highlight the importance of professors' fair behavior regarding students' academic achievement, interest, and motivation in the subject, and their choice to continue in their current field or switch fields.^{14,15} If students possess a high level of motivation, they will listen carefully to the professor's explanations, diligently complete their assignments, and seek more information on the subject matter. Therefore, educational officials must reduce feelings of inequality among students, as justice is closely related to motivation.¹⁶

Physical factors, another related topic, include the physical environment, welfare facilities, educational resources, and adherence to regulations. The experience of educational justice in educational environments can enhance the performance levels of students who have individual differences in various aspects, such as social, economic, and cultural backgrounds.¹⁷

Most students recognize that having a good environment is fundamental to educational justice, and the physical classroom environment plays a significant role in students' academic, psychological, and behavioral performance, serving as a good predictor of their academic achievement.¹⁸ Generally, without a suitable environment, satisfaction with education becomes more challenging. Students' dissatisfaction with unequal educational facilities across all sectors leads to noticeable

motivational damage.^{19,20} Authorities need to ensure students' justice rights and non-discriminatory access to education for all students, while also considering differences in students' needs.⁶

Educational justice plays a crucial role in enhancing self-esteem, commitment, improving job opportunities, elevating social status, and socialization. With the impact of equality on commitment, if students perceive a lack of educational justice, they may lose their commitment as students who are supposed to acquire knowledge and professional skills.²¹

Therefore, identifying its components from the perspective of medical students who have been studying for a long time (7 years) and are rich in different experiences in their learning environments will help us in future planning. It will also help in clarifying the accreditation standards for the general medical course regarding the implementation of educational justice. Given that effective analysis of qualitative data plays a vital role in research, especially in educational studies, this approach helps us identify key coherences and meanings in the field of educational justice. Content analysis is a method that allows for the explanation of the desired concept by examining the experiences and perspectives of individuals and analyzing the common factors between these perspectives.²² Therefore, we used a conventional content analysis approach because it was important for us to extract the components of educational justice based on the perspectives and experiences of students so that they corresponded to what the students felt and experienced.

Considering the aforementioned points regarding the importance of educational justice and the emphasis placed on it in the curriculum and accreditation standards for general medical education (WFME), this study aimed to explain the perspectives and experiences of general medical students regarding educational justice in medical schools.

Methods

Design and Setting(s)

This applied research utilized a qualitative design based on a conventional content analysis approach to collect and analyze the perspectives and experiences of general medical students concerning educational justice in medical schools. Conventional qualitative content analysis involves coding data categories that are extracted directly and inductively from raw data. Conventional content analysis involves gaining information directly from participants without imposing predetermined categories.

Participants and Sampling

The participants were general medicine students at Mazandaran University of Medical Sciences in the academic year 2024-2024. Participants were selected from basic medical science students using a purposive sampling method with maximum variation based on age, gender, and residence status.

Data Collection Methods

To achieve the research goal, the data collection tool was semi-structured interviews. The interviews were conducted in a quiet location at a suitable time for the participants, with prior coordination and permission. Before the interview, the participants were provided with information regarding the study design in the form of a study information sheet. Participation in the study was entirely voluntary. Written informed consent was obtained from all participants before the interviews. Participants were informed that they could withdraw from the study at any time without any academic consequences. Confidentiality and anonymity of the collected data were assured. The interview questions were open-ended and designed through a review of the literature and collaboration with knowledgeable advisors. At the beginning of the interview, the research objectives were explained. (Table 1)

In cases where clarification was needed, follow-up and probing questions were used to elucidate the topic. The duration of each interview averaged between 30 and 45 minutes, varying according to the participants' responses. The interviews were conducted when the participants were physically and mentally prepared and responded patiently to the questions. After each interview, the participants were thanked and appreciated for their cooperation. The interviews were fully recorded with the participants' permission at the beginning, and important points were noted. The recorded conversations were transcribed verbatim within 24 h.

To ensure the validity and credibility of the data, Guba and Lincoln's four criteria—credibility, confirmability, dependability, and transferability—were considered.²³ The credibility of the data was achieved through the repetition of the participants' statements and summarizing their points, allocating sufficient time for data collection, establishing good communication with participants, and conducting interviews in locations chosen by them. Additionally, to enhance the study's credibility, a combination of researchers with varying backgrounds was utilized in the research process. The confirmability of the results was achieved by sending the interview transcripts along with the derived categories to several reviewers for their feedback during the analysis. Researchers maintained documentation throughout all stages of the study to ensure the study's confirmability. The researcher's interest in the studied phenomenon, their long-term engagement with it, and efforts to gather opinions from others in this area were additional factors that ensured confirmability.

For dependability, the data were provided to another researcher in the role of an external auditor to ensure that a similar understanding existed and similar results were obtained. Additionally, the dependability or stability of the data was ensured by documenting all research details, taking notes at every stage of the work, and confirming the interview transcripts and extracted categories with several participants. Regarding transferability, efforts were made to provide comprehensive information about the research and its conditions.

Data Analysis

Data analysis was performed using conventional content analysis as proposed by Hsieh and Shannon. After each interview, audio recordings and field notes were transcribed verbatim and reviewed multiple times to ensure immersion in the data and a thorough understanding of participants' accounts.

Data collection and analysis were performed concurrently in an iterative process. Following each interview, meaning units were identified, and initial codes were generated through inductive, line-by-line coding. The emerging codes were continuously compared with previous data using the constant comparative method.

Coding was initially conducted independently by two researchers (A.Z & M.S). Subsequently, the two coders met to review and compare the codes and subcategories. Overall, there was agreement in the wording and naming of 39 codes, while 21 codes differed in terminology but showed conceptual agreement. These synonymous codes were subsequently reconciled and harmonized through discussion, resulting in 100% conceptual agreement between the two coders. The researchers (A.Z & M.S) sent two other researchers (S. M & A. Zh) a copy of the agreed-upon coding results to further enhance the credibility and consistency of the coding process. In cases of discrepancies or differences in interpretation, discussions were held within the research team, and final decisions were reached through consensus.

As the analysis progressed, similar codes were merged, and redundant or overlapping codes were refined to enhance clarity and conceptual consistency. Codes were then organized into subcategories and further abstracted into higher-level categories based on conceptual similarity. Throughout the analytic process, categories were continuously reviewed and refined through discussions with the research team, including the supervisor and advisors, to ensure coherence and fidelity to the data.

This iterative process continued alongside data

Table 1. The interview questions

1. What do you think educational justice means?
2. Is the existence of justice in medical education necessary? Why?
3. Please share your experiences regarding the implementation of educational justice in your classrooms.
4. Please share your experiences regarding the implementation of educational justice in your educational environment.

To further achieve the research goal, guiding questions were used. The guiding questions for the interview included:

1. Can you provide an example?
2. Can you explain further?
3. Please elaborate on the implementation of educational justice concerning the facilities and educational environment of the university, or provide an example if possible.

collection, allowing categories to be progressively refined as new insights emerged. Data collection proceeded until data saturation was achieved, defined as the point at which no new codes, subcategories, or meaningful concepts were identified in the final interviews.

To ensure methodological rigor and transparency, an audit trail documenting coding decisions, category development, and analytic revisions was maintained throughout the study.

Results

In this study, 12 interviews reached data saturation (Table 2). Through the analysis of the interview texts, 60 initial codes, 19 subcategories, and 8 categories were extracted. The categories are: Educational justice from the student's perspective; the flow of justice in education; inclusive and equitable education; fair interactions and behaviors; access to fair opportunities; fair arrangement of professor distribution; fair access to educational and welfare facilities; Causes and obstacles to educational injustice (Table 3).

The data analysis also revealed that students had three definitions of educational justice, with each student defining it based on their academic achievement. These three definitions are: "Having equal rights and entitlements", "Access to opportunities and resources based on deficiencies and weaknesses", and "Receiving privileges based on talent and effort." In the first definition, there is a strong emphasis on ensuring justice in education and implementing equal educational laws and regulations. Student P6 remarked

"In my opinion, students in any city or province they live in and at any level or position academically should have equal and sufficient access to education."

In the second definition, students primarily viewed justice as being based on deficiencies and weaknesses. Participant P4 mentioned:

"Justice is a concept that goes beyond this, so it is better to allocate more quotas for those who have less access to resources to achieve equality."

The third definition of justice refers to considering

students' talents and individual efforts in accessing various educational opportunities. Student P3 stated:

"I studied at Allamah School in Tehran and lived in a lower-income area of Tehran. The first day I entered the school, I felt depressed because most students were from affluent and upper-class backgrounds in Tehran, and it seemed like they had paid a price to be in a gifted school and belonged to a specific class. I believe that everyone should have access to good education based on their talent and effort to achieve their goals in this field."

Another category extracted from the study pertains to the flow of justice in education. According to students' perspectives, when justice is defined as "receiving privileges based on talent and effort," it is mainly achieved through acquired justice (equity). Also, according to the students' experience, the other two definitions of educational justice —"having equal rights and entitlements" and "access to opportunities and resources based on deficiencies and weaknesses" relate to executive justice (equality). Participant P1 stated:

"Part of educational justice must be implemented by professors and faculty, and another part, I think, is acquired, and students must take action to achieve equality..."

However, all students, regardless of their definition of educational justice, all students categorized it based on their shared experiences and perspectives into "inclusive and equitable education"; "fair interactions and behaviors"; "access to fair opportunities"; "fair arrangement of professor distribution"; "fair access to educational and welfare facilities"; "Causes and obstacles of inequality." They described it as sometimes desirable and sometimes undesirable based on their experiences, considering their local or non-local characteristics, dormitory or non-dormitory status, and gender. They cited increasing student capacity, issues related to providing resources, and limitations of resources and facilities as reasons for this injustice. Some examples of the statements by the participants:

Participant P10 said: "In anatomy classes, 25 people sit around a table. The professor teaches only one table,

Table 2. Demographic Characteristics of Participants in the Study

Participant Code	Gender	Age	Native or non-native	Dormitory and non-dormitory
P1	Male	19 years old	Native	Non-dormitory
P2	Female	18 years old	Native	Dormitory
P3	Male	21 years old	Non-native	Dormitory
P4	Female	19 years old	Native	Non-dormitory
P5	Male	20 years old	Non-native	Dormitory
P6	Female	21 years old	Native	Dormitory
P7	Male	20 years old	Non-native	Non-dormitory
P8	Female	19 years old	Native	Dormitory
P9	Female	21 years old	Native	Dormitory
P10	Male	21 years old	Non-native	Dormitory
P11	Male	19 years old	Non-native	Dormitory
P12	Female	21 years old	Native	Dormitory

Table 3. Analysis of Interviews and Extracted Codes

Basic Codes	Subcategory	Category
Everyone should be educated under the same conditions, regardless of their financial means or not, and wherever they are Enjoying the same right to education Equal and minimal access for all Fair and equal distribution of opportunities	Enjoying equal rights and privileges	Educational justice from the students' perspective
Adequate access to educational content Give more quota to those with less access to facilities Allocate points according to each person's weaknesses and deficiencies	Access to opportunities and facilities based on deficiencies and weaknesses	
Allocation of special points to individuals based on their effort and level of success Equality in enjoying a level of education based on individuals' effort and hard work Access to good education according to each individual's talent and interest	Enjoying privileges based on talent and effort	
Implementing equality through good faith and good management without bias Equal and non-discriminatory access to resources	Executive justice (Equality)	
Students themselves take action and strive to achieve equity in the learning process. Everyone has access to educational services according to their ability and effort.	Acquired justice (Equity)	The flow of justice in education
Consulting with diverse students in educational planning Giving students equal opportunity to participate in class planning Creating and participating in student advisory organizations, such as student mentoring	Equality in educational decision-making and planning	Inclusive and equitable education
Conducting exams based on the course plan Respecting fairness in evaluating and grading students Respecting fairness in assigning grades among professors for courses that have more than one professor Relevance of exam questions to the quality of the professor's teaching	Equality in assessment and evaluation	
Teaching by teachers of the same level in different groups for practical classes Teachers' teaching approach and methods	Equality in teaching	
Equality in the behavior of the professor, regardless of gender differences Behaviors and actions of educational staff towards students How self-catering staff and vehicle drivers behave towards students Equal treatment between native and non-native students	Behavioral equality	
Allocating sufficient time by professors to teach students Allocating equal time for students to do practical work in laboratories Scheduling and grouping practical classes based on native and non-native students' conditions – dormitory or non-dormitory An equal amount of time for practical classes Adhering to the same training duration for native and non-native students Allocating class time to teaching and avoiding irrelevant personal memories	Time equality in education	Access to fair opportunities
Adequate ventilation and lighting for all classes An adequate number of classroom chairs to prevent the creation of two groups of students: sitting and standing All students can hear the teacher's voice regardless of whether the student is sitting in the first or last row. Proportion of the models to the number of students for anatomy lessons Equal access to sports facilities Fair and equal allocation of space, time, and library facilities for students at the university Equal facilities in practical classes without ethnic and national bias	Equality in the teaching of practical and theoretical courses	
Similar teaching by similar professors without ethnic and national orientation, such as Iranian and international professors Equality in access to superior and good professors	Justice in students' access to top professors	
Equality of universities in having a sufficient number of good and superior professors Equality in access to good and superior professors, regardless of the type of university	Equal access for universities to top professors	
Shuttle service between dormitories and non-dormitories Shuttle service for Iranian and foreign students	Equality in the shuttle	Fair access to educational and welfare facilities
Accommodation for students in need of dormitories Equal access to classroom and dormitory facilities between government and international students Fair distribution of dormitory rooms between upper- and lower-year students The difference between native and non-native students is due to difficulty in allocating dormitories to natives	Equality in accommodation and dormitories	
Rules related to the clothing of Iranian and international students No difference between different genders regarding dormitory travel rules	Justice in implementing university laws and regulations	
Access to appropriate and equal self-service food Equality, in turn, volume and distribution of food in self-service (Iranian and non-Iranian or native and non-native)	Equality in nutrition	
Equality between universities in allocating appropriate space and facilities for practical and theoretical classes Equality between universities in space, time, and library facilities Equality between universities in allocating welfare, nutritional, and distance to urban areas	Justice between universities for educational space and facilities	Causes and obstacles to educational injustice
Increasing capacity hinders the administration of equality Problems related to the provision of facilities Inequality due to limited resources and facilities	Reasons for injustice	

and the other table is taught by PhD students in anatomy. Some of them are good, but some are not good at all.

Participant P8 said: "In other universities outside the city, they usually build the university as a township with various facilities such as a supermarket, dry cleaners, fruit and vegetable shops, and even a theater or cinema. However, this university has limited facilities."

Student P9 said: "They discriminate between male and female students in commuting. Girls have to return to the dormitory earlier, and if their classes last until the evening and they have shopping and work in the city, they do not have enough time and opportunity to commute."

Discussion

This study aimed to explain the experiences of general medical students regarding educational justice in medical schools. Based on the findings, before addressing the state of educational justice in medical schools, it is essential to clarify the necessity and definition of educational justice as experienced by students.

According to this study, all participants identified justice as a vital aspect of medical education. They viewed justice in terms of its impact on treating and caring for patients, as well as from a learning perspective. For example, participant P7 stated, "We are medical students, and in the future, we are supposed to enter society as doctors and deal with people's lives. On the one hand, we are more visible to the public, and they expect more from us as physicians. Therefore, there must be justice so that we can help the community in the best possible way." According to Pourfathani and Moomi Mohammadi, having a positive understanding of educational justice and awareness of the future career prospects of medical students can enhance their academic motivation.²⁴ Given the negative and significant relationship between educational justice and various dimensions of students' academic burnout, emotional exhaustion, academic disinterest, and academic inefficiency²⁵, it is important and at the same time difficult to consider the perspectives of different students in a comprehensive definition of educational justice. Especially after the experience of COVID-19, it has been recommended to redefine educational justice based on key factors. Biberman-Shalev and Sabbagh emphasized shaping educational justice in the post-COVID-19 Era. They suggested four interrelated domains of educational justice that included access to education, pedagogical practices, assessment and grading, and teacher-student relationships.²⁶

This study also identified another factor. It seems that what influenced students' views on educational justice more than other factors were their expectations of the academic environment based on their level of academic achievement. It is the difference between equity and equality. In fact, the findings suggest that students' understandings of educational justice varied according to their academic experiences and perceived circumstances. Some participants emphasized equality, particularly equal rights, access, and treatment, whereas

others emphasized equity-related considerations, such as responding to differences in needs, disadvantages, abilities, and effort. Thus, students' accounts of educational justice incorporated both equality- and equity-oriented understandings rather than representing a single uniform conception of justice. This affected the categories and subcategories of the study. However, most students focused on the concept of equality. In general, the codes and subcategories extracted for the concept of equality referred to equal access and the elimination of direct discrimination in the educational process, policies, and resources. The concept of equity also emerged mainly in subcategories that focused on responding to needs and deprivations based on individuals' talents and efforts.

According to the studies, justice, equity, and equality are distinct but related concepts. Equality refers to providing equal resources, opportunities, or treatment to individuals regardless of their circumstances. In contrast, equity is rooted in ethical principles and emphasizes the allocation of resources and support based on individuals' needs and deprivations in order to achieve equitable opportunities and outcomes. Justice represents a broader structural concept that focuses on addressing the social, institutional, and systemic factors that create inequalities. Consequently, justice can be viewed as an ultimate goal, with equity acting as a mechanism to achieve it and equality as one of its possible manifestations.⁴

This study revealed 60 initial codes, 19 subcategories, and 8 categories for educational justice. These topics were also highlighted in the literature review section. For example, Yamani et al. identified five main categories (effective curriculum, learner development, fair behavior of instructors, fair assessment, and equitable environment) for educational justice in their study, with the categories of fair behavior of instructors, fair assessment, and equitable environment aligning with the findings of this study.²⁷ Beigzadeh et al. identified five themes of educational justice: accountable education, support systems, fair research, fair education, and resource management.²⁸

Shahraki et al. also indicated that students' views on educational justice varied. The main concerns of students were the lack of attention to their conditions, lack of equal access to professors, advisors, and administrators, limited access to the Internet, and lack of attention to sports and cultural issues.¹⁵ This aligns with the findings of the current study regarding the subcategories of justice in access to equal facilities for practical and theoretical courses and the reasons for injustice.

This similarity in themes, concerns, and perspectives could be due to students' shared expectations for equitable access to resources and facilities. It also highlights the need for a fair management system for the distribution of equipment and manpower and the enforcement of laws.

Rozario et al. at Notre Dame University in Bangladesh identified six thematic areas for educational justice, including financial equality, gender equality, ethnic equality, student-faculty relations, student support, and professional development, which are consistent with the

findings of the current study.²⁹ Although these aspects were identified in the current study in the form of codes or subcategories, the extracted categories had a broader perspective than the codes. This may be due to differences in context and the population studied, as the mentioned study included not only students but also administrators and faculty members.

In Farrell's study, access to a capable and interested professor, equal access to facilities and equipment, adherence to rules and regulations according to the dignity of the student, and training skilled students who can contribute to individual and social growth were identified as dimensions of educational justice.³⁰ In the study by Mohammadi et al, participants stated that student evaluations should be based on predetermined criteria and objective tools. An accurate and transparent evaluation based on objective criteria is one of the main factors influencing educational justice in the environment of medical universities.³¹

The qualitative study by Sanagoo et al. also revealed that "the method of evaluating professors" was among the issues that concerned students most. According to the students in this study, the lack of superiority of one student over another and the method of evaluating professors are two factors that can challenge adherence to educational justice. The students believed that every student, regardless of gender, ethnicity, self-confidence, major, appearance, and social interactions, has their place, and if these criteria are involved in student evaluation or learning, educational justice is undermined.³²

All findings from the aforementioned studies align with those of the current study. However, in this study, the definition of equality-based student experiences was different, and this should be considered when evaluating the state of educational justice in medical schools.

Among the limitations of the current research are its focus on the medical school of Mazandaran University of Medical Sciences and the limited sample size, which consisted solely of basic science students (first- to third-year medical students). Based on the findings of the current study, it is recommended that future studies develop appropriate frameworks and tools based on the findings of this study and similar studies to examine the existing conditions. Future research should investigate the components of educational justice in clinical education. Future studies are recommended to adopt multi-stakeholder approaches to provide a more comprehensive understanding of educational justice.

Conclusion

According to the current study, educational justice is a multidimensional and complex structure in the medical sciences context. Students' accounts incorporated both equality- and equity-oriented understandings of fairness, reflecting the importance of equal rights and access as well as responsiveness to differences in students' needs, circumstances, abilities, and efforts. Students' views on the components of educational justice were influenced

by various factors such as the students' educational level (strong, weak, and average) and their definition of educational justice. In addition, this study showed that increasing student capacity, issues related to providing resources and limited resources, and facilities are among the most important reasons for injustice in the educational system. Therefore, to establish educational justice, it is necessary to first solve the most basic problems and limitations. It is also recommended that educational policymakers redefine educational justice based on the concept of academic achievement and pay attention to this issue in future studies and educational accreditation visits.

Acknowledgments

We would like to appreciate the medical students who devoted their time and thoughtful comments, and shared their lived experience to make this research possible.

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Competing Interests

The authors declare no conflict of interest.

Ethical Approval

This research is approved by the Mazandaran University of Medical Sciences Research Deputy (Ethics code: IR.MAZUMS.REC.1402.18313). After oral coordination with the participants and sending the information sheet to them, written informed consent was provided by all participants.

Funding

This research is approved and granted by the Mazandaran University of Medical Sciences Research Deputy (design code: 21152).

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