



Assessing the Level of Concentration and Full Presence of Perfectionist Students in Online Education During the COVID-19 Pandemic

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Abstract

Background: COVID-19 changed the global view of education in less than a few weeks and changed how students are taught worldwide. Online education, while having many advantages, also brings limitations and problems for some students. Therefore, this study was conducted to investigate the “level of concentration” and “full presence in the class” of perfectionist students in online education among the exceptionally talented students of the higher secondary school in Iran.

Methods: This cross-sectional study was performed on 100 randomly selected exceptionally talented students of a higher secondary school in Karaj, Iran. The research tools included perfectionism and concentration skill questionnaires that were provided to students online.

Results: The findings showed no significant difference in the class’s level of concentration and full presence between students with different degrees of perfectionism ($p=0.514$ and $p=0.247$, respectively). However, due to the technical problems of online classrooms, 64% of students with high perfectionism were fully present in the classroom in less than 30 min. This rate was 47% for students with low perfectionism.

Conclusion: It seems that due to the difference between face-to-face and virtual learning environments, holding online classes along with determining and setting the topics of lessons and training hours differently from face-to-face classes and shorter and more concise in creating an interactive atmosphere may be more useful.

Keywords: Concentration, Full presence, COVID 19, Online education, Perfectionism

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Introduction

It is estimated that since the beginning of the COVID-19 pandemic, more than 1.5 billion children worldwide have been affected by the closure of schools or universities, and distance education has been introduced to many students (1). According to UNESCO, the crisis caused by the COVID-19 pandemic has so far affected more than 363 million learners worldwide. Accordingly, due to the COVID-19 crisis, one in five students drop out of school (2). Also, face-to-face teaching has been completely or partially stopped for a relatively long time after the start of the pandemic in many countries around the world (3).

Unpredictability and uncertainty related to the disease and the seriousness of its consequences were leading to public health measures such as social distancing, closure of schools and universities, restrictions on public religious ceremonies, restrictions on meetings (such as competitions, conferences, and concerts), quarantine at home, reducing the working hours of employees of departments and institutions and holding training classes on public and personal health as important components of local, national and international measures to prevent the spread of COVID-19 (4-11).

After the official announcement of the first COVID-19 identification report in Iran on February 18, 2020, schools and universities in Iran were closed on February 29, 2020, as one of the emergency measures to prevent the further spread of the disease. It is estimated that in addition to university students, more than 14.5 million children and adolescents were confined to their homes (12).

On the other hand, due to the closure of schools, extensive efforts were made by the Ministry of Education, offices, schools, and teachers across the country at all levels to create a suitable platform for online and distance education (13). Research findings on the role of cyberspace on students' academic achievement show that cyberspace, despite some of its disadvantages (14), can be a good platform for strengthening, expanding, and exchanging knowledge and thus scientific and cultural progress (15).

Also examining the relationship between cyberspace and students' academic achievement demonstrates that despite the negative impact of the overuse of

Facebook and the Internet on students' academic achievement, regulating the use of Facebook and the Internet for entertainment can improve students' academic achievement and students' academic performance (16). Thus, the factors that contribute to the rapid growth of the e-learning process include the convenience of time and place, cost stability, resource scalability, digital literacy, and experiencing information enrichment (17-21).

The use of virtual education and methods of adapting students and teachers to these conditions is one of the most important challenges in the field of education since the changes made after the COVID-19 pandemic (22,23). This is happening in a situation where due to the learning methods of each person and the difference in technical support and course content design, online education may not be equally useful for all people and reduce the learning efficiency of some of them (24).

Meanwhile, perfectionists with some characteristics may be exposed to some of these problems (25). Perfectionism is a personality structure that demonstrates the attempt to achieve high standards for performance and the desire to evaluate oneself in a critical way (26,27). The perfectionist creates a set of harsh, unrealistic, and high standards; such a person engages in all-or-nothing thinking when evaluating his or her performance, and considers achieving these standards as the key to success (28-30). In this way, perfectionism may be evaluated with two types of dimensional approach (perfectionistic strivings and perfectionistic concerns) and group-based approach (healthy perfectionism and unhealthy perfectionism) (31). Considering the concept of perfectionism as maladaptive and adaptive, such a structure may reflect interpersonal problems or interpersonal adjustment (31).

According to Yang *et al*, learning stress is, in part, a mediator between self-oriented learning perfectionism and some learning burnout dimensions, such as the poor teacher-student relationship (32). Describing some attention-related metacognitive processes, along with the downregulation of certain brain regions (prefrontal cortex) and perfectionist traits, may provide evidence in favor of reduced sustained attention in this group of individuals (33).

There is a close relationship between motivation and

perfectionism (34). At the same time, focusing on perfectionism's 6 components, including personal standards, organization, doubts about actions, concern over mistakes, parental expectations, and parental criticism was noticed by experts (35). Based on such a broad description of its scope, a group of experts has found a lot of overlap between perfectionism and broad personality dimensions (36). Also, the positive relationship between multidimensional perfectionism and burnout has been emphasized in various studies and based on this, perfectionistic concerns have been associated with more maladaptive performances (37). This multi-dimensional feature cannot be explained only about specific situations and it is also prominent in different fields such as sports performance. The perfectionistic concerns are accompanied by maladaptive situations in this field, while the perfectionistic strivings have more complexities (38). With the intensity of non-adaptive behaviors, an increase in anxiety levels is observed, thus this intensity of anxiety is seen in groups without perfectionism at lower levels than perfectionists with non-adaptive behaviors (39). On the other hand, perfectionism and procrastination are each associated with one another and also independently with depression (40).

Normal people have a variety of attention performances in different ways with the difference in variable anxiety levels. These ways include different aspects of attention, which can include content, capacity, distractibility, and selectivity (41). Anxious people have a malfunction in their attention systems (42). In this way, the increase in anxiety vulnerability is associated with a decrease in attentional control performance (43). In the meantime, maladaptive perfectionism is negatively related to academic performance and this relationship is mediated by anxiety (44). On the contrary, adaptive perfectionism is associated with high concentration in the work environment (45). Concentration means continuous attention (46), and sustained attention means the ability to continue paying attention to a situation or task when there are distractions and fatigue (47). Such a basis for the definition of concentration can be focused on the intensity of attention. In this way, it is possible to consider it with two distinct characteristics of automatic and controlled (48). Moment-to-moment

fluctuations in sustained attention have been factors in the formation of some theories related to multiple neural networks and their internal and external connections in the formation of sustained attention in recent years. Also, the role of potentially relevant biomarkers in this context is emphasized (49).

Having the right information and identifying the effects of e-learning on the performance of perfectionist students may be able to reduce the incidence of major problems related to their educational issues by creating appropriate educational planning.

To the best of our knowledge, no research has been conducted directly on the performance of perfectionist high school students during the COVID-19 pandemic. The purpose of this study was to investigate the level of concentration and full presence in online classrooms among students with different levels of perfectionism.

Our primary hypothesis is that perfectionism (with possibly mediated by increased anxiety) is associated with a decrease in concentration in online classes and a decrease in full presence in the class in case of technical problems such as voice and internet interruption. Learning stress along with some structural and functional brain changes such as changes in the prefrontal cortex may be other possible mediating components related to this process. On the other hand, the secondary effects of the COVID-19 pandemic on the formation of maladaptive performances (50) can be effective in a vicious cycle of the formation of maladaptive perfectionism versus adaptive perfectionism. Anxiety, depression, and procrastination may be the consequences of such mediation.

Materials and Methods

Study design

In this cross-sectional quantitative study, the relationship between perfectionism and the level of concentration and full presence in class among a group of high school boys and girls in the city of Karaj, Iran has been investigated. The students were selected from students of two exceptional talents of the higher secondary schools who need to take competitive entrance exams to attend those schools. The study was conducted in two girls 'and boys' centers in higher secondary schools, which include

grades 10 to 12. The total number of students in these two schools is 620.

This study was conducted between November 2020 and April 2021. Since February 2020, when COVID-19 spread in Iran, until the implementation of this study, high schools in Iran held their classes online, and students were able to attend school only during the end-of-year exams, taking into account social distance.

The required information was obtained through an online questionnaire from the participants in the study. This information was further evaluated and statistically analyzed. At the time of the study, Iran was still witnessing various pandemic peaks. Participation in the study was completely optional, and students could participate in the study if they and their parents (each individually) wished, after sending a text message explaining the study, which included a description of the characteristics and objectives of the study, to the parents' cell phones.

Participants in the study were asked to report their parents' contact numbers if they wished to follow up on the student's condition for further psychological evaluations (for proper concentration). For this purpose, a psychiatrist who was a faculty member of the department of psychiatry of Alborz University of Medical Sciences was also ready to follow up on cases that required related interventions, if the student and his/her family wished (completely free of charge). Students and their parents were informed that the information provided by them was strictly confidential and would not be disclosed to any individual or institution. They were also informed that participation in any subsequent consulting services, in addition to being optional, would be free of charge.

Data collection

Before completing the questionnaire, participants' demographic information (in terms of age and gender status) was questioned. The age of the participants was in the range of 15 to 18 years and their level of education was grade 10 to 12 in high school. The residence of all the participants was the city of Karaj, the capital of Alborz province of Iran, which is located in the suburbs of Tehran province as the capital of Iran and is a metropolis with a population of about 3 million people. Perfectionism status, concentration level, and

full presence were assessed using perfectionism and concentration skill questionnaires, respectively.

Procedures

a) The Site: The statistical population of this study consisted of a group of exceptional talents students of the higher secondary school in the 3rd district of Karaj, Iran who were studying in the academic year 2020-2021.

b) Selection of the Participants: In this research, random cluster sampling has been used to select a statistical sample. First, two schools of exceptional talent students of the higher secondary school in District 3 of Karaj (one school for girls and one school for boys) were selected, and then two classes were randomly selected from each school to answer the research questionnaires. In total, the statistical sample of the study included 100 people (54 girls and 46 boys). No information obtained from the study was discarded since all the data were filled in correctly and completely by the participants.

Study measures

Perfectionism questionnaire: This scale was designed by Frost *et al*, which includes 35 items and 6 subscales called Personal Standards (7 questions), Order (6 questions), Concerns about mistakes (9 questions), Doubts about actions (4 questions), Parental expectations (5 questions) and Parental criticism (4 questions) (51). The scoring method of this 5-point scale was strongly agree (5 points) to strongly disagree (score 1) so that the total score is obtained from the sum of the scores under the scales. Accordingly, in this questionnaire, each person's score was between 35 and 175. If in each component and total questions of the questionnaire (total perfectionism), the scores are divided by the number of questions, and the score of each person is between 1 to 5. In this case, a score of 3 is considered the cut-off point (average).

Parker and Adkins reported the validity and reliability of this scale as favorable. In their report, the reliability according to the calculation of Cronbach's alpha coefficient for all questions of the questionnaire was equal to 0.88 and at the level of its subscales was between 0.57 to 0.95 (52). Khawaja and Armstrong also documented the construct validity of the

questionnaire through exploratory factor analysis in an Australian sample. They reported Cronbach's alpha associated with the whole questionnaire as 0.90 and at the subscale level between 0.7 and 0.9 (53).

In Iran, this questionnaire has been evaluated and its validity and reliability for the Iranian population have also been confirmed. In the study of Golparvar *et al*, Cronbach's alpha for all subscales of this questionnaire was calculated between 0.6 and 0.83 (54). Samaei *et al* also evaluated the psychometric properties of the questionnaire in Iran and reported internal consistency of scores on a total scale of 0.926 and for the whole subscales, between 0.751 and 0.913 (55).

Concentration skill questionnaire: This questionnaire was prepared by Savari *et al* and has 13 articles (8 articles related to intentional concentration scales and 5 articles related to unintentional concentration) (56). The scoring method of the mentioned questionnaire items is done on a five-point scale from never with a score of 1 to most of the time with a score of 5 (with a score range of 13 to 65). If in each component and total of the questionnaire questions, the scores are divided by the number of questions, the score of each person is between 1 to 5. In this case, a score of 3 is considered the cut-off point (average).

Based on the results related to reliability, Cronbach's alpha's total questionnaire was 0.74, which was obtained for the subscales of intentional and unintentional concentration equal to 0.72 and 0.70, respectively, indicating the appropriateness of the mentioned tool. Also, the validity of the questionnaire has been checked and confirmed using confirmatory

factor analysis.

Statistical methods

The results of the study were analyzed in SPSS software version 26 (IBM Corp., Armonk, New York, USA). To analyze the data, the descriptive statistics method has been used. Descriptive data were expressed in terms of frequency and percentage. By calculating the average scaling in different groups and by drawing tables, the desired comparisons were made. Chi-square tests were used to examine the significance of the relationship between the variables of perfectionism and concentration, and perfectionism and complete presence. p-values less than 0.05 were considered statistically significant.

Ethical considerations

The studies involving human/animal participants were reviewed and approved by the Research Ethics Committee of the Center for the development of exceptional talents. This study was conducted with the permission of the Research Ethics Committee of the Center for the development of exceptional talents, with the research code number 140099.

In all the measures taken in the study, the principles of the Helsinki Declaration and its appendices were observed. After providing explanations related to the project, online consent was received from students and their parents to participate in the research project. The information obtained remained confidential.

Results

The statistical sample of this study was 100 students, including 54 girls (54%) and 46 boys (46%). According to table 1, the concentration in the group

Table 1. The degree of concentration and the rate of perfectionism of the participants and comparing the statistical significance of their differences based on Chi-square tests

Degree of concentration	High perfectionism		Medium perfectionism		Low perfectionism		p-value
	Number	Percent	Number	Percent	Number	Percent	
High	3	8	6	12	1	5	0.514
Medium	12	41	16	34	7	36	
Low	22	64	25	53	11	57	

of high perfectionists was such that 8% of them were highly focused during the online classroom, 41% were moderately focused, and 64% of them were lowly focused during the classroom. Also, the level of concentration in the group of students with moderate perfectionism was such that 12% of them had high concentration during the online classroom, 34% had medium and 53% of them had low concentration during the classroom. In the low-perfection group, 5% of the subjects were highly focused, 36% were moderately focused, and 57% were low-focus during the class.

As can be seen in table 2, among students with high perfectionism, 5% of them spent the entire online class time in the classroom. 29% of students were in class for less than 60 min. 64% of them were in the classroom for less than the first 30 min. Also, among students with moderate perfectionism, 14% of them attended the class for the entire duration of the class. 34% of students were in class for less than 60 min. 51% of them spent less than the first 30 min in class. Among low-perfection students, 26 percent attended the entire class. 26% were in class for less than 60 min and 47% were in the classroom for less than the first 30 min.

The findings showed that there was no significant difference in the level of perfectionism and degree of concentration on the one hand and full presence in the whole class for 90 min in case of technical problems such as voice and internet interruption on the other hand ($p=0.514$ and $p=0.247$, respectively). However, due to the technical problems of online classrooms, 64% of students with high perfectionism were fully present in the classroom in less than 30 min. This rate

was 47% for students with low perfectionism.

Discussion

The purpose of this study was to investigate the level of concentration and full presence in a class of high school students with different degrees of perfectionism. The findings of our study showed that there is no significant difference in the degree of concentration during the class between different groups of students with different degrees of perfectionism.

In our study, more than half of the students in all groups with different perfectionism had low concentration. However, the differences between online and face-to-face classes, in some indicators such as communication with the instructor and peer-to-peer communication and some related indicators, especially during the COVID-19 pandemic, need further evaluation (57). At the same time, in a more detailed study of these results, it is necessary to pay attention to the results of the study of Haresabadi *et al* which reported a low level of concentration as the most common educational problem among students in face-to-face classes (58).

Concentration means attention and thoughtfulness when doing something, therefore other than that, a particular stimulus does no effect on the mind and attention of the person. Concentration in online classrooms during a pandemic may seem more difficult than the concentration in face-to-face classes. Since some/all classes are online during the quarantine period and on the other hand, in these classes, the causes of distraction and concentration deficits due to environmental factors may be more

Table 2. Full presence in the whole class for 90 min in case of technical problems such as voice and internet interruption among students with different levels of perfectionism and comparing the statistical significance of their differences based on Chi-square tests

The whole duration of the class	High perfectionism		Medium perfectionism		Low perfectionism		p-value
	Number	Percent	Number	Percent	Number	Percent	
More than 60 min	2	5	7	14	5	26	0.247
30-60 min	11	29	16	34	5	26	
Less than 30 min	24	64	24	51	9	47	

available, and it may be more difficult to have enough concentration in the online classes than in face-to-face ones (59). Factors such as cell phones, laptops, internet availability, as well as other distractions such as the special circumstances of being at home and with family, can impair concentration (60), although the results of studies in this area have been scattered and variable (61). In our study, while this difference was not seen in different groups of students with different levels of perfectionism. Overall, a higher percentage of all students had a low concentration in the classroom.

The findings of the present study represent that the degree of perfectionism of students is related to a full presence in the classroom, although statistically, this difference was not significant. Accordingly, among highly perfectionist groups, in the presence of technical problems such as voice and internet interruptions, a higher percentage of students was present in the classroom for less than the first 30 *min* compared to the duration of fewer than 60 *min* or the duration of the whole class (90 *min*). This is in a situation where the more we move towards other groups with less perfectionism, the more this percentage of continuity in class is seen. Also, the rate of full presence in the class was higher in students with less perfectionism.

The important point to note in this regard is that teaching online has different characteristics. For example, the capacity for flexibility to change time and place, the production of content in different forms of media, visual, text, and audio, and the capacity to access the various content produced in this educational space can be mentioned. Despite all these positive features, using this environment requires planning and balancing hours and teaching methods. In addition, the limitation of group activities and the loss of technical skills are predictable (62). The physical absence of the teacher, the lack of enthusiasm for group classes, the availability of miscellaneous equipment, and sometimes the recording of classes, cause some students to postpone attending classes to another time (63).

Another important possible reason for reduced concentration and presence may be the inconsistency of educational content with the online environment. The amount and content of textbooks are designed for

face-to-face education, and this makes it impossible to use all the features of the online environment in a useful way. Therefore, it may cause students not to follow the classroom after a while and to leave it. Thus, it seems that such a change needs to be preliminary, and the sudden entry into the field of virtual education due to the necessity of the COVID-19 pandemic is accompanied by a decline in performance and reduced concentration of students, especially among students with high perfectionism (64,65).

Another reason that can be attributed specifically to students with high perfectionism is that in the event of internet problems and momentary disconnections from the classroom, the continuity of what they are writing or learning is possibly wiped out. In this way, this feeling of the incompleteness of the booklets and textbooks reduces their motivation to continue the class so that they can listen to the classes from the beginning and again at a more appropriate time. This can be important given the characteristics of perfectionist students (25-27).

One of the strengths of the recent study is the special attention paid to the important problem of online education challenges related to the recent pandemic in reducing the concentration of students, especially among perfectionist students. This study was also conducted among selected students who, based on the highest scores obtained from entrance exams among other students, succeeded in attending exceptional talents schools.

One of the limitations of our study is that it is held among higher secondary schools with a certain number of participants. Conducting studies at the level of several educational centers and with the participation of students with different levels of scientific abilities and at different educational levels can be considered in future studies. Also, due to the cross-sectional nature of our study, conducting studies with longitudinal or interventional design can be associated with related benefits.

Conclusion

It seems that due to the differences between face-to-face and virtual learning environments and especially the technical problems related to this space, the schedule of online classes should not be similar to the usual face-to-face classes. It seems that holding

online classes more shortly and concisely is more useful. Using the features of online platforms such as image sharing, photo sharing and related side files such as PowerPoint and others may also be helpful in this regard.

Also, creating an interactive atmosphere while involving students in the teaching space may be accompanied by increasing attention to the class and continuing to attend with enthusiasm until the end of the class. To increase awareness of the best conditions for holding classrooms until more effective control of COVID-19 pandemic conditions, other studies with different designs can be used, including the participation of all students with different levels of knowledge and different levels of education and more schools. Since the consequences of educational problems related to the COVID-19 pandemic can be repeated in the conditions of other possible pandemics or any public health threat, attention to the results of the present study can be effective for educational policymakers to achieve more effective methods of

online education in the future.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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