

Investigating the Factors Related to Coronavirus Disease 2019 (COVID-19) on Undergraduate Students' Interests in Coursework

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ARTICLE INFO

Article History:

Received 27.03.2020

Received in revised form

04.06.2020

Accepted 19.06.2020

Available online

12.09.2020

ABSTRACT

Today the world is suffering from coronavirus (COVID-19) pandemic illness, and people all around the world stay at home due to its rapid spread. People including students gather information and government instructions through TVs, social media and others around them. Since the classes were canceled in many countries, the novel coronavirus affects students' interest in coursework. The purpose of this study was to examine the effect of TV news, social media and communication with people on interest in coursework, and mediating roles of fear of contamination, depression, and anxiety on these effects. A path analysis was carried out with the data collected from 773 college students. The results showed that interest in coursework was most strongly affected by communication with people. This was due to its direct and indirect effects. Social media and TV News did not directly affect interest in coursework, but indirectly affected. The study also found that among the three mediator variables, the mediator roles of anxiety was bigger than the others. Understanding the findings of this research has become very important to us, especially at a time when face-to-face lessons have been canceled all over the world and transitioned to online education. Specific recommendations for practitioners and limitations for future research were also provided in the study.

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Keywords:

COVID-19, stress, anxiety, fear, interest in coursework, path analysis

1. Introduction

Coronavirus (COVID-19) outbreak has quickly affected all over the world, and caused serious physical and mental health issues. After the first case COVID-19 illness was identified in Wuhan, China in December 2019, many people died in China and the coronavirus spread all around the world. Only 44 cases were identified in Wuhan, China on 31 December 2019. However, as of 20 January 2020, 282 cases from four countries including China, Thailand, Japan and the Republic of Korea and six deaths were reported. Then, the World Health Organization (WHO) labeled COVID-19 as the pandemic disease on March 11th, 2020 ("WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020," n.d.). In the update by 26 March 2020 from WHO (2020), for example, in more than 130 countries, 462,684 cases were confirmed, and 20,834 deaths were reported ("Novel Coronavirus situation reports," n.d.). Thus, COVID-19 has been quickly spreading all over the world, and having negative impacts on health, social, economic, politic, and education systems ("Coronavirus disease 2019," 2020; Cauchemez, Ferguson, Wachtel, Tegnell, Saour, Duncan, & Nicoll, 2009; Effler, Carcione, Giele, Dowse, Goggin, & Mak, 2010; Ingram, 2016). Similarly, the first case was observed in Turkey on March 10th, 2020, and the number of cases and deaths has increased quickly.

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<http://dx.doi.org/10.17220/ijpes.2020.03.001>

Therefore, COVID-19 pandemic has caused threats to people in health, social, economic, educational areas. The literature well documented the negative impacts of pandemic diseases on society, students and education systems (e.g. Cauchemez et al., 2009; Van, McLaws, Crimmins, MacIntyre, & Seale, 2010). Even though, most patients of COVID-19 have been adults and children are less susceptible, school closures in many countries have been implemented to prevent the spreading of the virus (Wikipedia Contributors, 2020). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), governments all around the world have announced nationwide closures of schools, which affected more than 80% of the world's student population (UNESCO, n.d.). In Turkey, by 16th March 2020, Ministry of National Education announced to close the schools from kindergartens to high schools for at least until the end of April, as a proactive action. In addition, The Council of Higher Education in Turkey decided to close universities and initiate online education during the spring semester. Overall, uncertainty and school closures can have negative effects on students' interests in schools, and the factors that affect students' interests in schools should be explored in terms of minimizing the effects of a pandemic on education (Cauchemez et al., 2009).

One of those factors that can affect school interests can be information regarding COVID-19 transmitted through media and social media. As expected, the news and information related to COVID-19 have been taken huge parts in the media (e.g. TV) and social media (La et al., 2020; Roose & Gabriel, 2020; Signorini, Segre, & Polgreen, 2011). Especially after people were ordered to stay home, news and communication on social media increased by over 50 percent in many countries (Isaac & Frenkel, 2020), and, for example, exposure to social media can have negative effects on students (Maglunog & Dy, 2019). Therefore, students are exposed to a high volume of news and information about COVID-19, and this can be one of the potential reasons that can diminish their interests in the school by shifting their focus from school to concerns related to pandemic. It should also be noted that such information or news is not necessarily true, or even can be misleading. For example, Pandey, Patni, Singh, Sood, and Singh (2010) examined 142 youtube videos that had relevant information about the H1N1 Influenza Pandemic on June 26, 2009, regarding their usefulness and viewership. Results showed that 61.3% of the videos included useful information while 23% had misleading knowledge about the Influenza pandemic. In addition, viewership shared 70.5% of the useful videos, the share proportion of misleading videos was 17.5%. In conclusion, being interested in media, social media, or daily communication about COVID-19 are potential external factors reducing interest in school. However, the effects of media, social media, and communication with others on reduced school interest can be delivered through other factors. In this sense, stress, anxiety, and fear of contamination are potential mediating variables, which are underlying factors on the association between such external factors (media, social media, and daily communication) and reduced school interest.

1.1. Stress, Fear, and Anxiety Related to Pandemic

Pandemic issues can lead to emotional responses, such as higher levels of anger, stress, fear, or anxiety in society. In turn, those emotions can lead to behaviors of panic, resistance, blaming others and government, overburdening of healthcare, and abandoning responsibilities (Perrin, McCabe, Everly, & Links, 2009). Pandemics such as SARS or COVID-19 have considerable social and psychological impacts on society (Perrin et al., 2009). Although COVID-19 has been studied in terms of its physiological symptoms and effects, its' mental effects and consequences on patients and healthcare workers have not been well addressed (Xiang et al., 2020). Fear is one of those initial reactions in such pandemic (Perrin et al., 2009). Fear is defined as a negative emotional reaction to a threatening stimulus, which generally leads to defensive responses (Labar, 2016). In this regard, COVID-19 pandemic causes several threats for human health, so people can experience higher levels of fear during the outbreak. Another negative emotion that can arise from the pandemic can be anxiety. Anxiety refers to unease emotion regarding a potentially negative, unpredictable situation (Labar, 2016; Lake & Labar, 2011). COVID-19, by its nature, causes a high levels of uncertainty in terms of physical and mental health, economic, education and other areas. Therefore, it is a risk factor for escalated level of anxiety. COVID-19 outbreak induced several challenges and difficulties for the society, so stress is another negative emotion that can be resulted from the pandemic. Regarding negative emotional outcomes of COVID-19, Xiang et al. (2020) mentioned that symptoms of COVID-19 such as fever, cough, or hypoxia can lead to higher levels of anxiety and distress. If the social and psychological side of the problem cannot be addressed seriously, it can cause higher levels of concerns, and even lead to a crisis (Perrin et al., 2009).

The literature has well documented that pandemic diseases include potential threats for escalated levels of stress, fear, and worry. For example, in a study conducted with 1,000 adults in Korea during the 2015 MERS-CoV outbreak (Ro, Lee, Kang, & Jung, 2017) showed that worry levels of the participants constantly increased through the points when the first patient was diagnosed with MERS, the first patient died, and the number of cases continued to increase. However, the levels of worry significantly decreased when the MERS outbreak ended (Ro et al., 2017). In the case of the 2009 H1N1 pandemic, Taha, Matheson, Cronin, and Anisman (2014) found that greater levels of intolerance of uncertainty were related to lower levels of control, which was associated with higher levels of pandemic-related anxiety. Health anxiety, contamination fears and disgust sensitivity were found to be significant predictors of swine-flu related anxiety during the H1N1 influenza pandemic of 2009–2010 (Wheaton, Abramowitz, Berman, Fabricant, & Olatunji, 2012).

The literature has also shown that pandemic-related anxiety is especially high in the early phase of the outbreak and declines over time. For example, in a study investigating the cognitive and affective risk perceptions during the MERS-CoV outbreak in South Korea, participants' cognitive and affective risk perceptions decreased as the time passed by (Jang et al., 2020). In another study, Cowling et al. (2010) examined the psychological and behavioral responses of the community to the first wave of the Influenza A(H1N1) Pandemic in Hong Kong. Low anxiety throughout the epidemic was reported, but perceived susceptibility to infection and perceived severity were initially high but declined later. In addition, higher levels of anxiety were found to be related to greater social distancing (Cowling et al., 2010). In addition, Bults et al. (2011) found that anxiety decreased after the first phase and remained stable overtime during the early phase of the Influenza A (H1N1) pandemic in the Netherlands.

1.2. The Present Study

Thus far, we have said that COVID-19 can have considerable negative effects on education and students' interests in school ("Q&A on coronaviruses" 2020; Xiang et al., 2020). However, because there is still an absence of the data, the literature has suggested examining the effects of pandemics on students' learning process and psychological situation (e.g. Cauchemez et al., 2009). Especially, being interested in media, social media, and daily conversation has potential threats to undergraduate students' interests in school. However, we hypothesize that such effects on school interests can be delivered through fear, anxiety, and stress. For example, Remmerswaal and Muris (2011) found that children's' fear reactions to the 2009 Swine Flu pandemic in Netharlend were associated with their parents' fear of the pandemic and there was a positive association between parents' transmission of threat information and children's fear. In addition, information from the media and friends were other significant predictors of children's fear (Remmerswaal & Muris, 2011). All in all, news and conversations related to COVID-19 take a considerable place in the media, social media, and daily conversations, which can escalate undergraduate students' fear, anxiety, and stress. In turn, those feelings have potential threats for diminished interests in school and academic activities.

1.3. Research Questions

1. What are size of the direct and direct effects of social media, TV news and conversation with people on interest in coursework?
2. What are size of the direct and direct effects of social media, TV news and conversation with people on anxiety?
3. What are size of the direct and direct effects of social media, TV news and conversation with people on stress?
4. What are size of the direct and direct effects of social media, TV news and conversation with people on fear of contamination?
5. What are the mediating roles of fear of contamination, stress and anxiety in the relations between social media, TV news and conversation with people and interest in coursework?

2. Method

2.1. Participants and Procedure

The data were collected from undergraduate students currently attending a four-year college program in Turkey. There were 587 (75.9%) female and 186 (24.1%) male students from four universities in the sample, for a total of 773 students. The age of the participants was ranged from 18 to 49, with a mean of 21.63 and a standard deviation of 3.04. There were 113 (14.6%) freshman, 305 (39.5%) sophomore, 200 (25.9%) junior and 155 (20.1%) senior students.

The survey was created on Google Forms web-based application, and the electronic link was sent to about 800 students. The convenience sampling method was used in this study meaning that participation in the study was completely voluntary, and 773 of them filled the survey. The data collection process started right after the first case of coronavirus as the illness was announced by the officials on March 10th, 2020, and completed within five days. Since the classes were been canceled by the government, students filled the survey outside of regular class hours. There were seven attitude questions and three demographic items in the survey so; it took less than 60 seconds for each participant to complete the survey.

2.2. Measures

There were seven items in the survey, and each participant was asked to rate the items that best apply to them. The first item was related to social media posts on COVID-19. The item was "How much do the social media (Facebook, Twitter, WhatsApp, Instagram, etc.) posts related to coronavirus affect you?" The second item was related to TV News on COVID-19. The item was "How much do the TV News related to coronavirus affect you?" The third item was related to communication with people (CwP) around them. The item was "How much do communication on COVID-19 with relatives, friends or significant others around you affect you?" The response options for these first three items were ranged from "0= Never affecting" to "10= Affecting too much". The fourth item was perceived stress level. The item was "How much do COVID-19 illness increase your stress level?". The fifth item was perceived anxiety level. The item was "How much do COVID-19 illness increase your anxiety level?" The response options for these items (e.g., item 4 & 5) were ranged from "0= Never increasing" to "10= Increasing too much". The sixth item was the fear of contamination. The item was "How much do you fear that coronavirus would be transmitted to you?". The response options were ranged from "0= Not afraid at all" to "10= Afraid too much". The seventh item was Interest in Coursework (ICW). The item was "How much did your ICW/classes decrease after the coronavirus epidemic disease?" The response options were ranged from "0= Never decreased" to "10= Decreased too much". It should be noted that this item was negatively worded. Each student rated his/her perception or attitude about each of the survey items on a 10-point rating scale.

2.3. Data Analysis

Based on the literature, we first developed the path analysis model given in Figure 1. In the model, social media posts, TV News, and communication with people are the exogenous variables (e.g., no arrows pointing to them), and the remaining variables are endogenous variables. Based on this model, there are direct and indirect effects from the social media posts, TV News and communication with people to fear of contamination, stress and anxiety and ICW. Also, the indirect effects are mediated through communication with people to fear of contamination, stress, and anxiety. We hypothesized that there should be positive associations between exogenous variables and mediators, and negative associations between ICW and all other variables.

However, due to encountering model fit problems in the path model, we had to modify the hypothesized model by removing some of the insignificant paths. We also added a new path from anxiety to stress. We call this new model a selected path model (see Figure 2). The bivariate correlations amongst all variables are given in Table 1. In the analyses, we treated all items as continuous indicators, and the responses to the ICW was reversely coded. This means that as the score on this item decreases, the ICW decreases. We run both hypothesized and selected models in Mplus software version 7 (Muthen & Muthen, 1998-2012), and used the bootstrap with 5000 iterations to obtain 90% confidence intervals for the effects. The sizes and 90% confidence interval of the total, direct and indirect effects of exogenous variables on endogenous variables are given in Table 2.

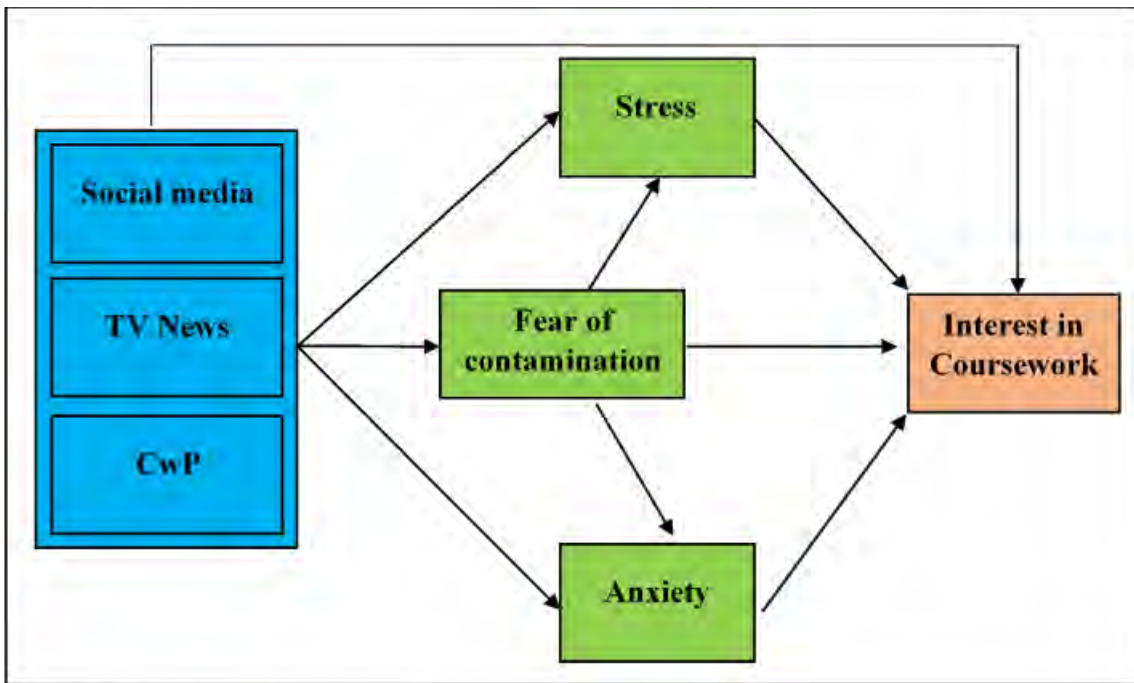


Figure 1. Hypothesized path model.

Note. CwP refers to communication with people

Table 1. Bivariate correlations, means and standard deviations amongst the observed variables.

Variable	1	2	3	4	5	6	7
1. Stress	--						
2. Anxiety	.88*	--					
3. Fear of Contamination	.71*	.70*	--				
4. Social Media	.71*	.70*	.59*	--			
5. TV News	.75*	.75*	.64*	.77*	--		
6. CwP	.77*	.75*	.62*	.74*	.79*	--	
7. Interest in Coursework	-.49*	-.48*	-.38*	-.36*	-.42*	-.45*	--
Means	6.09	6.20	6.06	5.98	6.68	6.17	5.73
SD	2.63	2.56	2.87	2.48	2.40	2.47	3.09

CwP =Communication with people, * $p < .01$

3. Results

3.1. Results of Model Fit

The fit indices of the hypothesized model were chi-square: $\chi^2(1) = 377.48$ and $p < .01$, Comparative Fit Index (CFI) = .87, Tucker-Lewis index (TLI) = -1.30, Root Mean Square Error of Approximation (RMSEA) = .70 and Standardized Root Mean Square Residual (SRMR) = .03. All of the model fit indices of the hypothesized model were not acceptable so, we removed all insignificant effects from the hypothesized model, and by looking at the modification indices, we added a path from anxiety to stress in the selected or final path model. The fit

indices of the selected path model were chi-square: $\chi^2(4) = 7.21$ and $p = .12$, Comparative Fit Index (CFI) = .99, Tucker-Lewis index (TLI) = .99, Root Mean Square Error of Approximation (RMSEA) = .03 with a 90% CI of [.00, .07] and Standardized Root Mean Square Residual (SRMR) = .00. The fit statistics of the final model indicated a very good model fit.

3.2. Effects of Exogenous Variables

Social media. Social media posts had significant total effects on stress (.24), anxiety (.21), fear of contamination (.18), and ICW (-.10) ICW. Thus, the sizes of social media's effects on endogenous variables were similar. The .24 effect on stress was partially direct ($B = .09, p < .05$) and partially indirect ($B = .15, p < .05$). There were three specific indirect effects on stress as a) social media to anxiety to stress ($B = .10, p < .05$), b) social media to fear of contamination to stress ($B = .02, p < .05$), and c) social media to fear of contamination to anxiety to stress ($B = .03, p < .05$). All specific indirect effects were significant and the highest on stress was mediated through anxiety. The .21 effect on anxiety was partially direct ($B = .16, p < .05$) and partially indirect ($B = .05, p < .05$). Both direct and indirect effects were significant. As specified in the model, the indirect effect on anxiety was mediated through fear of contamination. The .18 effect on fear of contamination was entirely direct as shown in Figure 2. Lastly, the -.10 effect on interest in coursework was entirely indirect. There were six different specific indirect effects from social media to ICW but three of them were significant only. The significant specific indirect effects were a) social media to stress to ICW ($B = -.02, p < .05$), b) social media to anxiety to ICW ($B = -.04, p < .05$), and c) social media to anxiety to stress to ICW ($B = -.02, p < .05$). The mediated effects of social media posts on ICW were similar in size and the mediated effect through anxiety was relatively higher than the other mediated effects.

TV News. The TV news had significant total effects on stress (.25), anxiety (.32), fear of contamination (.41), and ICW (-.13). The .25 effect on stress was entirely indirect, and there was no direct effect from TV News to stress. There were three specific indirect effects on stress as a) TV news to anxiety to stress ($B = .13, p < .05$), b) TV News to fear of contamination to stress ($B = .05, p < .05$), and c) TV News to fear of contamination to anxiety to stress ($B = .07, p < .05$). All specific indirect effects were significant and the highest on stress was mediated through anxiety. The .32 effect on anxiety was partially direct ($B = .21, p < .05$), and partially indirect ($B = .11, p < .05$). The indirect effect was mediated through fear of contamination. The .41 effect on fear of contamination was entirely direct as specified in the model. The -.13 effect on ICW was entirely indirect and there was no direct effect from TV News to ICW. There were five specific indirect effects but four of them were significant. The five specific indirect effects were a) TV News to anxiety to ICW ($B = -.05, p < .05$), b) TV News to anxiety to stress to ICW ($B = -.03, p > .05$), c) TV News to fear of contamination to stress to ICW ($B = -.01, p < .05$), d) TV News to fear of contamination to anxiety to ICW ($B = -.03, p < .05$), e) TV News to fear of contamination to anxiety to stress to ICW ($B = -.01, p < .05$).

Communication with people. The CwP had significant total effects stress, anxiety, fear of contamination, and ICW, with total effects of .45, .38, .26 and -.38, respectively. The .45 effect on stress was partially direct ($B = .18, p < .05$) and partially indirect ($B = .27, p < .05$). There were three specific indirect effects on stress. They were a) CwP to anxiety to stress ($B = .20, p < .05$), b) CwP to fear of contamination to stress ($B = .03, p < .05$), and c) CwP to fear of contamination to anxiety to stress ($B = .04, p < .05$). All specific indirect effects were significant and the larger effect was mediated through anxiety. The .38 effect on anxiety was partially direct ($B = .31, p < .05$) and partially indirect ($B = .07, p < .05$). The indirect effect was mediated through fear of contamination only. The .26 effect on fear of contamination was entirely direct and did not have an indirect component as specified in the model. The -.38 effect on ICW was partially direct ($B = -.19, p < .05$) and partially indirect ($B = -.19, p < .05$). There were six specific indirect effects from communication to ICW but four of them were significant. The six specific indirect effects were a) CwP to stress to ICW ($B = -.04, p < .05$), b) CwP to anxiety to ICW ($B = -.08, p < .05$), c) CwP to anxiety to stress to ICW ($B = -.04, p < .05$), d) CwP to fear of contamination to stress to ICW ($B = -.00, p > .05$), e) CwP to fear of contamination to anxiety to ICW ($B = -.01, p < .05$), f) CwP to fear of contamination to anxiety to stress to ICW ($B = -.01, p > .05$). The highest effect was mediated through anxiety but all specific indirect components were very small in size.

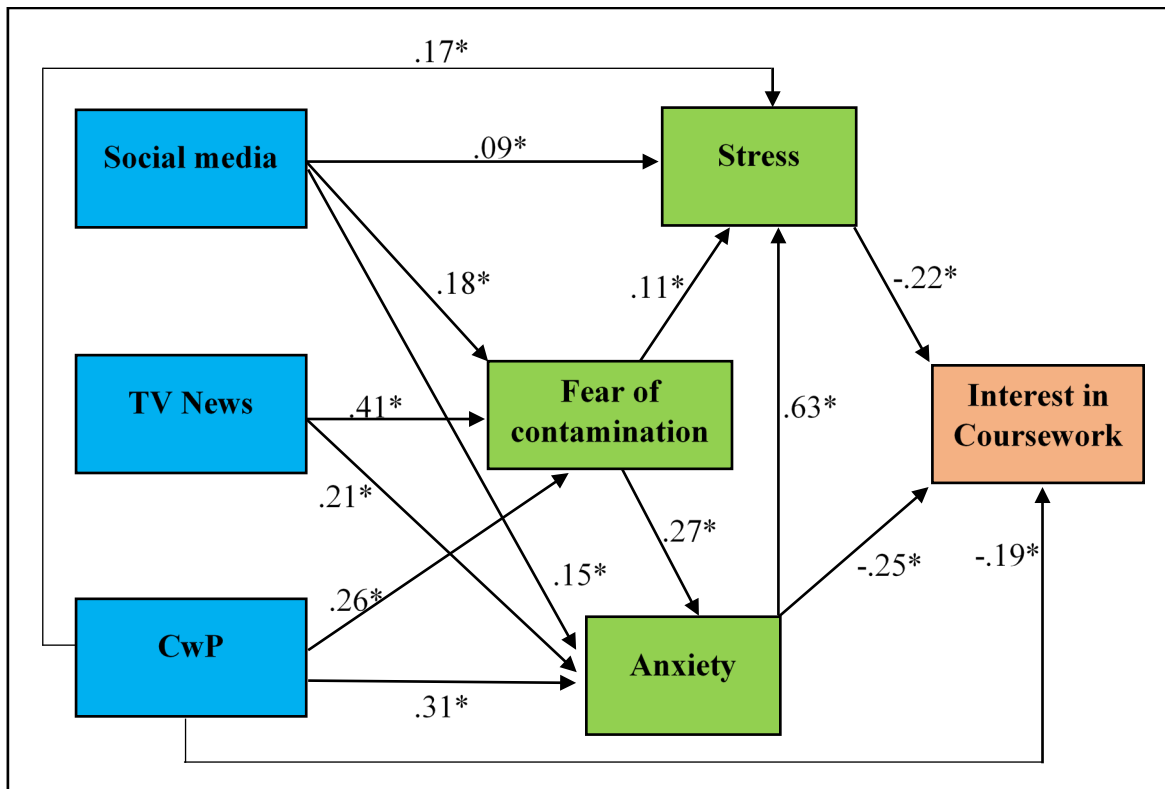


Figure 2. Final path model.

Note. CwP refers to communication with people

3.3. Effects on Endogenous Variables

Fear of contamination. The model specifies that fear of contamination was directly affected by all exogenous variables. The total effects were $.18$, $.41$ and $.26$ from social media, TV News and CwP, respectively. All effects were significant direct effects because the fear of contamination did not have indirect effects specified in the model. All effects were similar in size but fear of contamination was most strongly affected by TV News.

Table 2. The Sizes and 90% Bootstrap coefficients Confidence Intervals for Total, Direct and Indirect Effects of Variables in The Selected Path Model

Exogenous Variables	Endogenous Variables			
	Stress	Anxiety	Fear of Contamination	Interest in Coursework
Stress	--	--	--	-.22*[-.38,-.08]
	--	--	--	--
	--	--	--	-.22* [-.38,-.08]
Anxiety	.63* [.54, .72]	--	--	-.25*[-.40,-.09]
	--	--	--	-.14*[-.25,-.05]
	.63* [.54, .72]	--	--	-.39* [-.49,-.29]
Fear of Contamination	.11* [.07, .15]	.27* [.22, .32]	--	--
	.17* [.13, .21]	--	--	-.13*[-.17,-.09]
	.28* [.23, .33]	.27* [.22, .32]	--	-.13* [-.17,-.09]
Social Media	.09* [.04, .14]	.16* [.05, .22]	.18* [.07, .29]	--
	.15* [.10, .20]	.05* [.01, .08]	--	-.10*[-.14,-.07]
	.24* [.17, .31]	.21* [.14, .27]	.18* [.07, .29]	-.10* [-.14,-.07]
TV News	--	.21* [.13, .28]	.41* [.30, .52]	--
	.25* [.19, .31]	.11* [.07, .15]	--	-.13*[-.18,-.09]
	.25* [.19, .31]	.32* [.24, .40]	.41* [.30, .52]	-.13* [-.18,-.09]
Communication with People	.18* [.11, .24]	.31* [.24, .38]	.26* [.15, .37]	-.19*[-.30,-.08]
	.27* [.21, .34]	.07* [.04, .10]	--	-.19*[-.25,-.14]
	.45* [.37, .52]	.38* [.31, .46]	.26* [.15, .37]	-.38* [-.47,-.30]

Note. Direct effects in regular text, total *indirect* effects in italics, **total effects** in bold. The symbol -- means the effect is not in the model; * $p < .05$; all effects are unstandardized effects.

Anxiety. The model specifies that anxiety was directly affected by all exogenous variables and by fear of contamination. The total effects were .21, .32, .38 and .27 from social media, TV News, CwP and fear of contamination, respectively. The effects from the exogenous variables were partially direct and partially indirect, however, the effect from fear of contamination was entirely direct. Anxiety was most strongly affected by CwP (.38). The effect was primarily due to the direct effect of CwP on anxiety, with a direct component of .31. Secondly, the effect of CwP was mediated by its effects on fear of contamination only. The indirect effects of TV News ($B = .11, p < .05$) and social media ($B = .05, p < .05$) were also mediated by fear of contamination. The strongest indirect effect on anxiety was from TV News.

Stress. The model specifies that stress was affected by all exogenous variables and by fear of contamination and anxiety. The total effects were .24, .25, .45, .28 and .63 from social media, TV News, CwP, fear of contamination and anxiety, respectively. The proposed effects of TV News was entirely indirect but the other specified effects were both direct and indirect. The larger effects on stress were anxiety and CwP total effects of .63 and .45, respectively. Social media, TV News and fear of contamination have relatively smaller (i.e., .24, .25 and .27, respectively) but significant total effects. The effect of anxiety was entirely direct as proposed in the model. As noted earlier, the effects of TV News was entirely indirect. Its mediated effects were a) from TV news to fear of contamination to stress, with an indirect component of .05 ($p < .05$), b) from TV news to anxiety to stress, with an indirect component of .13 ($p < .05$), and c) from TV news to fear of contamination to anxiety to stress, with an indirect component of .07 ($p < .05$). Thus, the indirect effect of TV News on stress was primarily

mediated by anxiety. According to the model specification, the .24 total effect from social media to stress was both direct ($B=.09, p<.05$) and indirect ($B=.15, p<.05$). Thus, the total indirect effect was larger than the direct effect. Likewise, there were three specified indirect paths from social media to stress: a) social media to anxiety to stress ($B=.10, p<.05$), b) social media to fear of contamination to stress ($B=.02, p<.05$), and c) social media to fear of contamination to anxiety to stress ($B=.03, p<.05$). Thus, the indirect effect of social media on stress was primarily mediated by anxiety. The .45 effect from CwP was both direct ($B=.18, p<.05$) and indirect ($B=.27, p<.05$). There were three specific indirect effects from CwP. They were a) CwP to anxiety to stress ($B=.20, p<.05$), b) CwP to fear of contamination to stress ($B=.03, p<.05$), and c) CwP to fear of contamination to anxiety to stress ($B=.04, p<.05$). Thus, the indirect effect of CwP on stress was primarily mediated by anxiety. The .28 effect from fear of contamination to stress was both direct ($B=.11, p<.05$) and indirect ($B=.17, p<.05$). Thus, the effect was primarily due to the indirect effect of fear of contamination on stress. Secondly, the effect of fear of contamination was mediated by its effects on anxiety. Thus, anxiety played a very important mediator role between fear of contamination and stress.

Interest in coursework. According to the model specification, ICW was directly affected by communication with people, anxiety, and stress, and indirectly affected by all variables. The largest of the significant effects on ICW were CwP and anxiety, with total effects of -.38 and -.39, respectively. The other total effects were smaller in size but all were significant. There were four significant specific indirect effects from communication to ICW. These were a) CwP to stress to ICW ($B=-.04, p<.05$), b) CwP to anxiety to ICW ($B=-.08, p<.05$), c) CwP to anxiety to stress to ICW ($B=-.04, p<.05$), d) CwP to fear of contamination to anxiety to ICW ($B=-.01, p<.05$). Thus, anxiety played a major role in the indirect effect of CwP on ICW. The -.39 effect comes from anxiety was comprised of .25 significant direct component and .14 significant direct component. The indirect path was mediated through stress. Thus, stress played an important mediating role in the indirect path of anxiety on ICW.

The -.22 effect of stress on ICW was entirely direct as in the proposed model. According to the model specification, the effects of social media, TV News and fear of contamination were entirely indirect. The significant specific indirect effects from social media to ICW were a) social media to stress to ICW ($B=-.02, p<.05$), b) social media to anxiety to ICW ($B=-.04, p<.05$), and c) social media to anxiety to stress to ICW ($B=-.02, p<.05$). All effects were smaller in size and similar but anxiety relatively played an important mediating role in the indirect path of social media on ICW. The significant specific indirect effects from TV News to ICW were a) TV News to anxiety to ICW ($B=-.05, p<.05$), b) TV News to fear of contamination to stress to ICW ($B=-.01, p<.05$), c) TV News to fear of contamination to anxiety to ICW ($B=-.03, p<.05$), d) TV News to fear of contamination to anxiety to stress to ICW ($B=-.01, p<.05$). All effects were smaller in size and similar but the mediator role of anxiety was relatively higher than the other variables. The significant specific indirect effects from fear of contamination to ICW were a) fear of contamination to stress to ICW ($B=-.02, p<.05$), b) fear of contamination to anxiety to ICW ($B=-.07, p<.05$), c) fear of contamination to anxiety to stress to ICW ($B=-.04, p<.05$). All of the indirect effects were significant but the most powerful was through anxiety.

Discussion

The pandemic outbreaks that threaten human life, which we have encountered throughout history and will encounter in the future most likely, affect not only economic, social, and educational structures but also human behavior and emotions. Epidemic and pandemic outbreaks, such as MERS, H1N1, and SARS have also shown that people experience stress, fear and anxiety (Almutairi et al., 2015; Bults et al., 2011; Cowling et al., 2010; Maunder et al., 2006). Especially in our era, the global spread is followed as well as local ones. Not only people in China have been affected by the COVID-19 pandemic that occurred in Wuhan, but also people in India, Italy, Turkey, and many other countries have been affected biologically and psychologically. Therefore, it is crucial to understand the effects of COVID-19 outbreak on people's emotions and related consecutive outcomes such as school interests.

The current study investigated the effects of the last pandemic outbreak, COVID-19, on university students' ICW. More specifically, we examined the effects of external factors (TV news, social media, and communication with others) on undergraduate students' interests in coursework through intrinsic factors (stress, anxiety, fear of contamination, and ICW). Understanding such relationships is more important to us,

especially at a time when face-to-face lessons have been canceled all over the world and transitioned to online education.

The results of this study indicated significant direct and indirect effects of external and intrinsic factors on ICW. All correlations among the variables were significant (see Table 1). Students' ICW had the lowest relationship with social media ($r=-.36$) and the highest with stress ($r=-.49$). Contrary to our hypothesized model, there were no direct effects from social media and TV news to ICW. The only direct effect from external factors to ICW was CwP (-.19).

Communication with others had the highest total and indirect effect on ICW. This finding indicated that students were affected by the grapevine. In other words, when participants talked with their classmates, parents, roommates, or an ordinary person in their life about COVID-19, they were affected by their ideas, comments, and perspective of the pandemic. As a result, this directly decreased their interest in coursework by 19%. The decrease in ICW was doubled (-.38) as internal factors (stress, anxiety, and fear of contamination) involved and mediated into the model. Especially participants were stressed and anxious because of communication with others. Therefore, this can be concluded that participants' priorities shifted from interests in coursework to the current agenda, COVID-19. Among these priorities, courses were replaced by survival, not getting sick, and the protection of loved ones. As stated by Remmerswaal and Muris (2011), when people's closest ones they trust feel anxious and stressed, people will feel anxious and stressed as well. This finding was also consistent with Pandey and colleagues' finding (2010) indicating that there were misleading information and rumors affected people during the H1N1 influenza pandemic. Although competent bodies invite people to remain calm, sane, and disregard unscientific explanations, people can believe more of what others are saying. Thus, in order to keep school and coursework interest higher, students should be careful and selective when they are encountered with the information related to pandemic.

Another important finding was the direct and indirect effects of TV news on internal factors and ICW. TV news did not directly affect students' ICW but affected through increased stress, anxiety and fear of contamination. TV news had a moderate direct effect (.41) on fear of contamination. This finding made sense because after it was discovered that this was a rapidly transmitted epidemic, all national and international channels talked about it almost every day and in the news zone. People can develop irrational beliefs and fears when an issue is repeated too much (Timsit, 2020). For example, as in many countries, the initial reaction in Turkey was to buy and deplete antiseptic products on grocery shelves. Especially, people in Turkey bought cologne in particular because it was believed that the high alcohol content of the colony neutralizes the virus and reduces the risk of catching. Even this event showed how people were affected by the TV and fear of contamination. As students watched TV news, their fear of contamination, stress, and anxiety increased, so their ICW decreased. This finding was consistent with previous studies (de Silva Medeiros & Maasarani, 2010; Klemm, Das, & Hartmann, 2016; Van den Bulck & Custers, 2009). These researchers found that TV exposure and news were related to pandemic diseases. For example, Van den Bulck and Custers (2009) conducted a study after the H5N1 pandemic outbreak in 23 European Union states and found that mass media coverage triggered higher levels of fear.

Another finding worth discussion was the direct and indirect effects of social media on internal factors and ICW. Researchers (Balci & Baloglu, 2018; Karaman, 2020; Lin et al., 2016) indicated that the use of social media increased dramatically in the past 10 years. These studies showed when social media were used out of purpose and long hours it affected people both physically and psychologically negatively. In the current study, social media had the highest total effect on stress, anxiety, fear of contamination, and ICW respectively. Participants' levels of stress and anxiety increased when they looked at COVID-19 related posts. Consequently, social media affected ICW negatively via stress, fear, and anxiety. When especially considered that the information on the social media cannot be necessarily trustworthy, students should be additionally careful when receiving information from social media.

When we look at all these results in general, we realized that external factors were divided under two topics: 1) technological effect (social media and TV news) and 2) human effect (communication with others). Human factor had the largest effects on all variables except the fear of contamination. As Harry Stack Sullivan stated years ago "people make people sick and people make people well again" (1953, p.). Because COVID-19 outbreak threatens university students' school and coursework interest and it can lead to lower levels of school

success, the results of this study can guide practical implications. In this sense, it is important to carefully approach the information on TV news, social media, and daily communications. More importantly, the findings revealed that it is useful for students to handle negative emotions such as stress, fear, and anxiety. Educational programs, psychoeducational programs, and individual and group counseling implications can be delivered to students to help them handle negative emotional outcomes of the outbreak, so it can help them increase school interests.

The topic of this study is very important and unique in terms of conducting at pandemic times; however, the study has some limitations. First, because the classes were canceled out, we used a convenience sampling method; hence, the generalizability of the results can be limited. This study can be replicated by using a random sampling method. Second, the sample was predominantly female (3/4 female vs. 1/4 male). A further study should be conducted with a balanced sample. Third, in this study, we examined the relations among the items that intend to measure perceived psychological factors and did not use validated scales. It is recommended future research using scales such as depression or anxiety scales be conducted.

References

- Almutairi, K. M., Al Helih, E. M., Moussa, M., Boshaiqah, A. E., Saleh Alajilan, A., Vinluan, J. M., & Almutairi, A. (2015). Awareness, attitudes, and practices related to coronavirus pandemic among public in Saudi Arabia. *Family & Community Health, 38*(4), 332-340. doi:10.1097/FCH.0000000000000082
- Balci, Ş., & Baloğlu, E. (2018). The Relationship between social media addiction and depression: "A survey among university youth." *Galatasaray University Journal of Communication, 29*, 209-234. doi:10.16878/gsuilet.500860
- Bults, M., Beaujean, D. J., de Zwart, O., Kok, G., van Empelen, P., van Steenbergen, J. E., ... & Voeten, H. A. (2011). Perceived risk, anxiety, and behavioral responses of the general public during the early phase of the Influenza A (H1N1) pandemic in the Netherlands: Results of three consecutive online surveys. *BMC public health, 11*(1), 2-13. doi:10.1186/1471-2458-11-2
- Cauchemez, S., Ferguson, N. M., Wachtel, C., Tegnell, A., Saour, G., Duncan, B., & Nicoll, A. (2009). Closure of schools during an influenza pandemic. *The Lancet infectious diseases, 9*(8), 473-481. doi:10.1016/S1473-3099(09)70176-8
- Coronavirus disease 2019. (2020, March 22). Retrieved from Wikipedia website: https://en.wikipedia.org/wiki/Coronavirus_disease_2019#cite_note-Xiang4Feb2020-117
- Cowling, B. J., Ng, D. M., Ip, D. K., Liao, Q., Lam, W. W., Wu, J. T., ... & Fielding, R. (2010). Community psychological and behavioral responses through the first wave of the 2009 influenza A (H1N1) pandemic in Hong Kong. *The Journal of infectious diseases, 202*(6), 867-876. doi:10.1086/655811
- da Silva Medeiros, F. N., & Massarani, L. (2010). Pandemic on the air: A case study on the coverage of new influenza A/H1N1 by Brazilian prime time TV news. *Journal of Science Communication, 9*(3), A03.
- Effler, P. V., Carcione, D., Giele, C., Dowse, G. K., Goggin, L., & Mak, D. B. (2010). Household responses to pandemic (H1N1) 2009-related school closures, Perth, Western Australia. *Emerging infectious diseases, 16*(2), 205-211. doi:10.3201/eid1602.091372
- Ingram, A. (2016). Pandemic anxiety and global health security. In *Fear: critical geopolitics and everyday life* (pp. 93-104). Burlington, VT: Routledge.
- Isaac, M., & Frenkel, S. (2020, March 24). Facebook Is 'Just Trying to Keep the Lights On' as Traffic Soars in Pandemic. Retrieved from <https://www.nytimes.com/2020/03/24/technology/virus-facebook-usage-traffic.html>
- Jang, W. M., Kim, U. N., Jang, D. H., Jung, H., Cho, S., Eun, S. J., & Lee, J. Y. (2020). Influence of trust on two different risk perceptions as an affective and cognitive dimension during Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak in South Korea: Serial cross-sectional surveys. *BMJ Open, 10*(3). doi:10.1136/bmjopen-2019-033026
- Karaman, M.A. (2020). *Examining associations between social media use, depression, global health, and sleep disturbance among emerging adults*. (Manuscript is under review).
- Klemm, C., Das, E., & Hartmann, T. (2016). Swine flu and hype: A systematic review of media dramatization of the H1N1 influenza pandemic. *Journal of Risk Research, 19*(1), 1-20.

- La, V., Pham, T., Ho, T. M., Hoàng, N. M., Linh, N. P. K., Vuong, T., ... Vuong, Q. (2020). Policy response, social media and science journalism for the sustainability of the public health system amid COVID-19 outbreak: The Vietnam lessons. doi:10.31219/osf.io/vxhz5
- LaBar, K. S. (2016). Fear and anxiety. In L. F. Barrett, M. Lewis, & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (pp. 751-773). New York: The Guilford Press.
- Lake, J. I., & LaBar, K. S. (2011). Unpredictability and uncertainty in anxiety: A new direction for emotional timing research. *Frontiers in Integrative Neuroscience*, 5, 55. doi:10.3389/fnint.2011.00055
- Lin, L. yi, Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., ... Primack, B. A. (2016). Association between social media use and depression among U.S. young adults. *Depression and Anxiety*, 33, 323–331. doi:10.1002/da.22466
- Maglunog, G. P. A., & Dy, M. F. R. (2019). Facebook Usage and Depression Levels of Selected Filipino College Students. *International Journal of Psychology and Educational Studies*, 6(2), 35-50. doi:10.17220/ijpes.2019.02.004
- Maunder, R. G., Lancee, W. J., Balderson, K. E., Bennett, J. P., Borgundvaag, B., Evans, S., ... & Hall, L. M. (2006). Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerging Infectious Diseases*, 12(12), 1924-1932. doi:10.3201/eid1212.060584
- Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus User's Guide*. Seventh Edition. Los Angeles, CA: Muthén & Muthén.
- Novel Coronavirus (2019-nCoV) situation reports. (n.d.). Retrieved from www.who.int website: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
- Pandey, A., Patni, N., Singh, M., Sood, A., & Singh, G. (2010). YouTube as a source of information on the H1N1 influenza pandemic. *American Journal of Preventive Medicine*, 38(3), e1-e3. doi:10.1016/j.amepre.2009.11.007
- Perrin, P. C., McCabe, L., Everly, G. S., & Links, J. M. (2009). Preparing for an influenza pandemic: Mental health considerations. *Prehospital and Disaster Medicine*, 24(3), 223-230. doi:10.1017/S1049023X00006853
- Q&A on coronaviruses. (2020). Retrieved from Who.int website: <https://www.who.int/news-room/q-a-detail/q-a-coronaviruses>
- Remmerswaal, D., & Muris, P. (2011). Children's fear reactions to the 2009 Swine Flu pandemic: The role of threat information as provided by parents. *Journal of Anxiety Disorders*, 25(3), 444-449. doi:10.1016/j.janxdis.2010.11.008
- Ro, J. S., Lee, J. S., Kang, S. C., & Jung, H. M. (2017). Worry experienced during the 2015 Middle East respiratory syndrome (MERS) pandemic in Korea. *Plos One*, 12(3). doi:10.1371/journal.pone.0173234
- Roose, K. & Gabriel, J. X. D. (2020, March 23). The Coronavirus Revives Facebook as a News Powerhouse. Retrieved from <https://www.nytimes.com/2020/03/23/technology/coronavirus-facebook-news.html>
- Signorini, A., Segre, A. M., & Polgreen, P. M. (2011). The use of Twitter to track levels of disease activity and public concern in the US during the influenza A H1N1 pandemic. *PloS one*, 6(5). doi:10.1371/journal.pone.0019467
- Sullivan, H. S. (1953). *The collected works of Harry Stack Sullivan*. New York, NY: Basic Books.
- Taha, S., Matheson, K., Cronin, T., & Anisman, H. (2014). Intolerance of uncertainty, appraisals, coping, and anxiety: The case of the 2009 H 1 N 1 pandemic. *British Journal of Health Psychology*, 19(3), 592-605. doi:10.1111/bjhp.12058
- [Timsit, A. \(2020, March 9\). The psychology of coronavirus fear—and how to manage it. Retrieved from https://qz.com/1812664/the-psychology-of-coronavirus-fear-and-how-to-overcome-it/](https://qz.com/1812664/the-psychology-of-coronavirus-fear-and-how-to-overcome-it/)
- UNESCO (n.d.). COVID-19 educational disruption and response. Retrieved from <https://en.unesco.org/themes/education-emergencies/coronavirus-school-closures>
- Van den Bulck, J., & Custers, K. (2009). Television exposure is related to fear of avian flu, an ecological study across 23 member states of the European Union. *The European Journal of Public Health*, 19(4), 370-374.
- Van, D., McLaws, M. L., Crimmins, J., MacIntyre, C. R., & Seale, H. (2010). University life and pandemic influenza: Attitudes and intended behaviour of staff and students towards pandemic (H1N1) 2009. *BMC Public Health*, 10(1). doi:10.1186/1471-2458-10-130

- Wheaton, M. G., Abramowitz, J. S., Berman, N. C., Fabricant, L. E., & Olatunji, B. O. (2012). Psychological predictors of anxiety in response to the H1N1 (swine flu) pandemic. *Cognitive Therapy and Research*, 36(3), 210-218. doi:10.1007/s10608-011-9353-3
- WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. (n.d.). Retrieved from www.who.int website: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>
- Wikipedia Contributors. (2020, March 22). Impact of the 2019–20 coronavirus pandemic on education. Retrieved from Wikipedia website: https://en.wikipedia.org/wiki/Impact_of_the_2019%E2%80%9320_coronavirus_pandemic_on_education#cite_note-18
- Xiang, Y. T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The Lancet Psychiatry*, 7(3), 228-229. doi:10.1016/S2215-0366(20)30046-8