

Cyberbullying and Motivation to Learn with Digital Technologies: Identification and Correlation

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ABSTRACT – This article investigates the relationship of cyberbullying to motivation to learn and the use of digital information and communication technologies (DTIC). The survey included 529 high school and 293 higher education students who answered the Motivation to Learn Scale with the use of DTIC Scale and the Cyberbullying Assessment Scale. Statistically significant correlations were identified between the constructs, especially in high school. The relationships had a positive direction, weak and high magnitude. Cyberbullying and educational levels predicted controlled (28%) and autonomous (5%) motivation. Motivation and cyberbullying levels stood out in high school. This research contributes to pedagogical practices and the conduct of further studies on this theme.

KEYWORDS: Self-determination theory, TDIC, cyberbullying

Cyberbullying e Motivação para Aprender com as Tecnologias Digitais: Identificação e Correlação

RESUMO – Neste artigo investigaram-se as relações do *cyberbullying* para a motivação para aprender e o uso de tecnologias digitais de informação e comunicação (TDIC). Participaram da pesquisa 529 alunos do ensino médio e 293 do ensino superior que responderam a Escala de Motivação para Aprender com o uso das TDIC e a Escala de Avaliação do *Cyberbullying*. Identificaram-se correlações estatisticamente significativas entre os construtos, sobretudo no ensino médio. As relações tiveram uma direção positiva, de fraca e alta magnitude. O *cyberbullying* e os níveis de ensino predisseram a motivação controlada (28%) e autônoma (5%). Os níveis de motivação e *cyberbullying* se sobressaíram no ensino médio. Esta pesquisa contribui para as práticas pedagógicas e a condução de novos estudos sobre esta temática.

PALAVRAS-CHAVE: Teoria da Autodeterminação, TDIC, *cyberbullying*

The last decades have witnessed the advancement of Digital Information and Communication Technologies – DICT in different social sectors, especially in the school or academic context. These technologies have shown the potential to optimize teaching and learning processes (Akbari et al., 2015; Rashid & Asghar, 2016). With the advent of computer use and, more recently, the use of smartphones and tablets, it is possible to access knowledge through content displayed on the internet in all digital media (Yot-Dominguéz & Marcelo, 2017).

When investigating this scenario permeated by TDIC, researchers such as Arlia, and Sumiati (2015) and Sergis et al. (2018) observed that these digital technologies, among other possibilities, can improve the motivational quality of students as they allow the operationalization of more dynamic forms of access to knowledge. More specifically, in the school context, these digital media, notable those connected to the internet, when used for learning purposes, provide students with resources that enable them to access,

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systematize, manipulate, organize, evaluate and transfer the content produced (Flanigan & Kiewra, 2018).

Studies also show that using DICT can strengthen both the student's perception of belonging and their sense of commitment to their peers. Fathali and Okada (2017) identified that online study meetings provide students with a sense of connection, provide conditions to observe the productions of colleagues and, in parallel, also allow their academic/school achievements to be observed and valued by others. It contributed to promoting the perception of belonging among students. It contributed to promoting the perception of belonging among students. In this direction, research by Akbari et al. (2015) also pointed out that students who discussed carrying out their school tasks using DICT resources showed a greater commitment to their learning and group colleagues. These students could have quick feedback on the messages exchanged and a more significant amount of communication time than face-to-face teaching.

Lee et al. (2005) reported that young people are intrinsically motivated to use the internet in daily tasks, and even when they experience some difficulty using such devices, they persist in using this resource. However, researches show that the student's effort to use digital technologies in school/academic tasks is inferior to that performed to apply them in entertainment situations and/or when this use is directed to educational purposes sometimes it occurs from inadequate form (Flanning & Kiewra, 2018; Livingstone, 2011; Yot-Domínguez & Marcelo, 2017). Additionally, the longitudinal study developed by Livingstone (2011) showed that, although the participants used the web since childhood, the results revealed different and incipient knowledge about the appropriation of the potential offered by this system. They did not demonstrate the required literacy to critically and creatively use the many possibilities this resource offers.

If, on the one hand, digital technologies promote the democratization of access to information, being a powerful tool in the academic context, on the other hand, as observed by Peters et al. (2018), the inappropriate use of DTIC can significantly interfere with their psychological well-being. In this line, the considerations brought by Reyes and Bañales (2016) indicate that through technologies, there can be the online dissemination of content considered violent and inappropriate, which can trigger feelings of humiliation, degradation, and vulnerability in the subject victim of virtual violence.

In a face-to-face context, intentional violent action (performed by an aggressor) directed at a person (victim) is traditionally known as bullying. Cyberbullying, in turn, occurs when DTIC and resources such as smartphones, computers and other similar devices connected to the internet are used to intimidate, harass or harass the victim. Violent attacks, insults and defaming in the online environment are called cyberbullying (Slonje et al., 2012; Chao e Yu, 2017; Mallmann et al. 2018).

Cyberbullying is an action that is becoming more and more frequent in the academic environment. Although not

all students suffer this type of attack, those who have already experienced it tend to have severe impairments in their academic performance and mental health (Garaigordobil, 2017; Reyes & Bañales, 2016; Beluce et al., 2021). Specifically, in the school context, research carried out by the Regional Center for Studies for the Development of the Information Society – CETIC (see <https://cetic.br/sobre/>), carried out in 2018 mapped 11,142 elementary and high school students, covering all Brazilian regions. The results revealed that students access the internet to carry out school work and study for tests (92% and 86%, respectively), that access occurs more than once a day (87%), with the smartphone being indicated as the most popular device used (89%) to perform such access. Although 94% of students indicate that the internet significantly helps their school learning process, 30% of respondents report that they have already suffered insults and injuries, and 21% have already practiced some aggression online against another classmate.

Nevertheless, at the national level, it is worth mentioning the investigation by Oliveira (2016), who tried to investigate 70 adolescents from Juiz de Fora cyberbullying practices. The data indicated that approximately 20% of respondents stated that they had already published insults or embarrassing content/photos to target a colleague. Similarly, Mallmann et al. (2018) studied 273 the Rio Grande do Sul teenagers and the results indicated that 58% of the participants were directly or indirectly involved in cyberbullying. It is noted that this percentage is 20% above when compared to studies carried out in other countries, as pointed out by the authors.

The scientific literature on cyberbullying highlights the urgency of actions aimed at preventing and/or extinction of virtual bullying due to its consequences on victims' physical, emotional, and psychological health (Ansary, 2020; Garaigordobil, 2017; Souza et al., 2014; Watts et al., 2017). According to Souza et al. (2014) and Costa et al. (2021), identifying the people involved is the first and foremost preponderant action to combat cyberbullying.

Under these conditions, some researchers (Mason, 2008; Tognetta & Bozza, 2012) classified different roles in this violent practice: aggressor (who practices the violent action), victims (target of aggressors and retaliators), retaliators (person who was a victim of face-to-face bullying). and/or online and cyberbullying for revenge). Some spectators support the aggressor and spectators who aim to seek a solution or stop the attacks (Beluce et al., 2021; Macaulay et al., 2022).

Cyberbullying causes devastating effects, regardless of the educational level or stage of the student involved in this type of bullying (Beluce, 2019; Caetano et al., 2016; Erişti & Akbulut, 2019; Huang et al., 2020; Reyes & Bañales, 2016). Specifically, among high school and college students, studies by Garaigordobil (2017) and Souza et al. (2014) observed that this practice is increasingly present and has had a significant impact on the emotional and cognitive health of these students, even compromising the motivation to learn from students who suffer from these violent actions.

Considering that the promotion and strengthening of the student's motivational quality are necessary actions for the teaching and learning processes (Bzuneck, 2010), it is also relevant to bring considerations about the students' motivation to learn, based on both the assumptions of the Theory of Self-Determination – TSD (Deci & Ryan, 2000). According to TAD, the motivated individual engages in his/her tasks to meet three basic and universal psychological needs: competence, belonging, and autonomy. Such needs function as essential for the person's development, integrity, and well-being.

The TSD is composed of micro-theories, among which the Organismic Integration Theory (OIT), the focus of this study, addresses that people would have different types and motivational orientations and, therefore, would be guided by actions that underlie their motivational profiles (Deci & Ryan, 2000; Ryan & Deci, 2017). There is a distinction between the types of motivational orientations in this theory initially, there was a classification into two types, intrinsic and extrinsic motivation, and more recently, as Ryan and Deci (2017) point out, there was a better theoretical unfolding of the types, offering a motivational continuum with more controlled forms of motivation (composed of extrinsic motivation by external regulation and by introjected regulation) by more autonomous forms of regulation (identified regulation, by integrated regulation and intrinsic motivation).

In extrinsic motivation by external regulation there is a direction of actions searching for some reward/praise/benefit to satisfy self-esteem or even aiming to escape or evade some activity. In turn, extrinsic motivation by introjected regulation the person has actions guided by controllers internal to the subject (feelings of shame, guilt, pride, among others). In the case of motivation by identified regulation it refers to those who managed to internalize their regulation, to begin to recognize or accept the meaning or value of the activity performed. In integrated regulation, there is a complete regulation. Here the person is aware of his values and choices, using them to constitute his identity. It is a

more autonomous type of motivated behavior and is close to intrinsic motivation. In this way, in intrinsic motivation, the subject presents commitment and constancy in a given task, exhibiting satisfaction and interest concerning to what the accomplishment of the activity itself generates. Finally, there is the behavior that lacks motives. The person shows a complete lack of motivation about the object or activity (Bzuneck & Guimaraes, 2010; Ryan & Deci, 2000, 2017).

As previously pointed out, the use of DTIC in the context of study favors the promotion of students' motivation to learn (Akbari et al., 2015; Fathali & Okada, 2017). Faced with the growing adoption of these technologies by young people, especially those who attend high school and higher education, research that deepens knowledge on this topic becomes increasingly urgent (Heafner, 2004; Lee, Cheung & Chen, 2005; Stevens et al. ., 2018; Yot-Dominguez & Marcelo, 2017). Furthermore, investing in practices that encourage the adoption of digital technologies for learning is a necessary educational action so that the student can experience DTIC in a productive, judicious, and responsible way, instead of entertainment, sometimes based on unnecessary and/or false, or even for the use of intimidating and/or persecutory social actions.

Given the considerations raised, the core of this research was focused on investigating what would be the possible relationships and differences to be established between cyberbullying and the motivation to learn with the use of DTIC. With this perspective, the aims of the present study were to identify the roles of cyberbullying among high school and college students; to investigate the motivation of students (high school and college education) to study with the use of DTIC; to analyze the correlations between cyberbullying and motivation to learn and the use of DTIC; to verify the differences between cyberbullying and motivation to learn and the use of DTIC in high school and college education and, finally, to investigate the predictive potential of cyberbullying for motivation to learn and the use of DTIC having as a control variable the level of teaching.

METHOD

Participants

822 students participated in the research, 529 from high school (1st to 4th year; $M_{age} = 17.03$; $SD = 3.32$) and 293 from higher education (1st to 5th year of courses in the Exact Sciences, Human Sciences and Biological Sciences; $M_{age} = 24.61$; $SD = 7.66$). Most of the sample was female ($n = 532$; 65.3%) and from public educational institutions ($n = 444$; 54%). High school students lived in the states of São Paulo ($n = 198$; 37.4%), Mato Grosso do Sul ($n = 190$; 35.9%) and Paraná ($n = 141$; 26.7%), and all higher education students were from Paraná.

Instruments

Motivation Scale for Learning with the use of DTIC (MSL – DTIC; Beluce & Oliveira, 2019). The scale assesses the motivation to learn of high school and university students, as well as for the use of digital technologies in study situations. As pointed out in the study by Beluce and Oliveira (2019), the MSL – DTIC is currently the only Brazilian instrument that aims to assess the motivated behavior of high school and college students to learn using DTIC.

The scale has 18 items divided into three factors, referring to Controlled Motivation, Autonomous Motivation

and Demotivation. MSL – DTIC has three response labels: “Always”, “Sometimes” and “Never”. Among the scale items, it is possible to mention: “I use the internet to study because I enjoy expanding my learning” and “I think the internet is a resource that hinders my studies” (Beluce & Oliveira, 2019).

The MSL – DTIC has evidence of content validity, validity evidence based on internal structure, and reliability estimates (Beluce et al., 2021), and in the aforementioned study, these last two psychometric properties were investigated for the sample analyzed in this research. As for the factor loading scores of the scale factors, statistical analyses confirmed an alpha of .76 for the Controlled Motivation factor. An index of .79 was assigned to the Autonomous Motivation dimension, and a score of .98 for Demotivation (Beluce, 2019).

Cyberbullying Rating Scale (CRS; Beluce & Oliveira, 2019). The CRS assesses the perception of high school and college students about the roles of cyberbullying. It has 24 items divided into three factors: Victim, Aggressor and Retaliator. The three CRS Answer Key labels are: “Always”, “Sometimes” and “Never”. The items in the instrument include statements such as “Did (incited) people to offend me and/or make fun of (mean jokes) at me in chat rooms” and “I posted on social networks (Facebook, Twitter, others) mean/aggressive comments about someone from the university who did the same to me before.”

The scale has evidence of content and internal structure-based validity, as well as reliability estimates (Beluce, 2019). Thus, the internal structure and reliability of the CRS for this research sample are reported in Beluce (2019). It is worth reporting the Cronbach’s alpha indexes established for the three EAC factors, submitted to confirmatory factor analysis, which revealed a score of .96 for the Victim factor, the index of .99 for the Aggressor, and the alpha of .88 for the Retaliator (Beluce, 2019).

Data collection procedure

The Research Ethics Committee approved the project that gave rise to this research report. It is linked, meeting the precepts of Resolution No. 510/2016 and the complements of the National Health Council, as can be seen in Opinion No. 2.364.852. It is noteworthy that the parents/guardians of the underage students consented to the collection by Free and Informed Consent Form (FICF).

It is added that, prior to the effective participation of the student, we requested the reading and agreement of the FICF. A copy of the informed consent was given to underage students, requesting authorization from their parents/guardians to participate in the research. Thus, data collection

took place in person during the class period and collectively only after the consent of parents and/or guardians, in the case of younger students, and with the express consent of university students of legal age.

In the classroom, guidelines we presented on the necessary procedures for participation and completion of the measurement instruments. Students were instructed to mark questions that portrayed events/situations that had occurred more than once and for a period longer than 30 days. This procedure was also adopted in the study by Patchin and Hinduja (2015). The students took approximately 45 minutes to answer both instruments, the CRS and the MSL – DTIC.

Data analyses procedure

The Statistical Package for Social Sciences (SPSS; V. 22.0) and Mplus (version 7.11; Muthen & Muthen, 2012) software were used to analyze the data. The deviation from normality of the sample data was identified using the Shapiro-Wilk test, whose values presented $p < .05$ for all analyzed variables. Descriptive analyses were used to characterize the sample and determine the mean, median, and standard deviation of the factors of the instruments applied in the research. Spearman’s rank correlation (ρ) was used to evaluate the existing relationships between motivation to learn and to use DTIC and cyberbullying – parameters for interpreting the magnitude of the correlations: $\rho \leq .29$, weak; ρ between .30 and .49, moderate; $\rho \geq .50$, high (Goss-Sampson, 2020).

The predictive potential of cyberbullying for motivation to learn for DTIC use was investigated using the path analysis technique. Two prediction models were tested for each level of education. The first model (saturated) was structured as follows: CRS factors as independent variables (IVs) and MLS – DTIC factors as dependent variables (DVs). The standardized regression coefficients (β) that had $p > .05$ were excluded to compose the second model (restricted). The Maximum Likelihood Estimator with Robust Standard Errors (MLR) was used. The assessment of the plausibility of the restricted model was based on the χ^2 test, with $p > .05$, and on the Root Mean Square Error of Approximation, $RMSEA \leq .10$ (acceptable fit), Confirmatory Fit Index, and Tucker-fit indexes – CFI, and $TLI \geq .80$, moderate adjustment (Marôco, 2014).

To compare groups was used motivation to learn and to use DTIC and cyberbullying (DVs), and educational levels (IV), the Mann-Whitney test (U). The reference for interpreting the effect size of the non-parametric comparisons that obtained statistical significance was $r \leq .49$, small; r between .50 and .79, medium; $r \geq .80$, high (Cohen, 1992).

RESULTS

Table 1 shows the descriptive analyses of the factors in the CRS and the MLS-DTIC, and their correlations,

considering high school and college levels. In both levels of education, students showed higher mean scores for the

cyberbullying victim factor and lower mean scores for the bully factor. In comparison, in motivation, there were higher mean scores for autonomous motivation and lower mean scores for demotivation.

The statistically significant correlations presented in Table 1 show that controlled motivation was correlated with both victim and retaliatory cyberbullying in high School. In contrast, demotivation was correlated with all three indicators of cyberbullying. In higher education, demotivation had statistically significant correlations with the victim and retaliatory cyberbullying, and controlled motivation only with cyberbullying victim. These associations had a positive direction and weak magnitude.

Table 1 also shows that there were statistically significant correlations and positive direction between cyberbullying factors at both levels of education. There was a weak magnitude in the correlations between aggressor and cyberbullying victim, and between retaliator and aggressor cyberbullying. A high magnitude was found in the correlation between victim and retaliator cyberbullying.

Concerning motivation to learn and the use of DTIC in high school, Table 1 shows statistically meaningful correlations of weak magnitude and positive direction between controlled motivation and autonomous motivation and negative direction between autonomous motivation and the demotivation. For higher education, the correlations between motivational factors that obtained statistical significance were moderate magnitude and positive direction between controlled and autonomous motivation, and weak magnitude and negative direction between demotivation, controlled motivation, and autonomous motivation.

Next, the predictive potential of cyberbullying was investigated for motivation to learn and the use of DTIC in high school and college education. Table 2 shows the results of the path analysis technique (saturated model). In high school, cyberbullying practices referring to the victim and aggressor explained 10% of the variance in demotivation, while retaliatory cyberbullying explained 4% of the variance in controlled motivation. Autonomous motivation did not have its variance explained by aspects of cyberbullying. In higher education, none of the motivation factors to learn and the use of DTIC had its variance explained by cyberbullying, as all R^2 values had $p > .05$.

The variables whose β obtained $p > .05$ were excluded from composing the restricted model. Thus, as shown in Table 2, in the high school prediction model, controlled motivation, VI retaliatory cyberbullying were excluded from the DV; from the autonomous motivation DV were excluded all cyberbullying VIs, and from the DV demotivation were removed the VIs cyberbullying victim and aggressor. For higher education, controlled motivation and autonomous motivation were excluded from the VI cyberbullying aggressor; and from the DV demotivation was removed the VI cyberbullying victim.

Figure 1 presents the restricted prediction model for high school, which obtained $\chi^2 = 3.076$, $gl = 3$ ($p = .38$), qualified as adequate; RMSEA = .01 (CI .01 – .07); CFI and TLI = 1, adjustments classified as very good. Demotivation had 10% of its variance explained by victim and aggressor cyberbullying ($R^2 = .10$; $p < .05$). The practice of aggressive cyberbullying resulted in a .21-point increase in demotivation for learning and using DTIC ($EP = .07$), and victim cyberbullying

Table 1
Correlations between Cyberbullying and Motivation to Learn and DTIC Use

	<i>M (DP)</i>	1	2	3	4	5	6
High School							
1. Cyber Victim	3.41 (4.05)	-					
2. Cyber Aggressor	.24 (.69)	.29***	-				
3. Cyber_Retaliator	1.21 (1.89)	.56***	.26***	-			
4. Cont Motivation	5.84 (1.54)	.15**	.08	.18***	-		
5. Auto Motivation	7.75 (2.53)	.06	.02	-.01	.14***	-	
6. Demotivation	1.19 (2.28)	.11*	.15***	.14**	-.05	-.24***	-
Higher Education							
1. Cyber_Victim	1,83 (3,03)	-					
2. Cyber_Aggressor	.07 (.28)	.16**	-				
3. Cyber_Retaliator	.38 (1.09)	.50***	.15*	-			
4. Cont Motivation	4.98 (1.74)	.12*	.01	.09	-		
5. Auto Motivation	8.34 (2.54)	-.01	.03	-.02	.31***	-	
6. Demotivation	.88 (1.84)	.16**	-.01	.14*	-.16**	-.17**	-

Legends: Cyber_Victim = Cyberbullying Victim; Cyber_Aggressor = Cyberbullying Aggressor; Cyber_Retaliator = Cyberbullying Retaliator; Cont Motivation = Controlled Motivation; Auto Motivation= Autonomous Motivation. Grade. Values in bold indicate statistically significant correlations, being *** $p < .001$; ** $p < .01$; * $p < .05$.

resulted in a .16-point increase in demotivation ($EP = .06$). Controlled motivation had 3% of its variance explained by retaliatory cyberbullying ($R^2 = .03$; $p < .05$). The presence of this type of cyberbullying predicted a .17-point increase in controlled motivation ($EP = .04$).

In higher education, the predictive model represented by Figure 2 had $\chi^2 = 7.430$, $gl = 3$ ($p = .06$), considered adequate; $RMSEA = .07$ (CI .01 – .14), classified as an acceptable

adjustment; $CFI = .95$, good adjustment; and $TLI = .85$, moderate adjustment. The practice of victim cyberbullying presupposed an increase of .35 points in demotivation ($EP = .10$); the decrease in the aggressor cyberbullying resulted in a decrease of .15 points in autonomous motivation ($EP = .07$) and in controlled motivation ($EP = .08$). However, the aspects of victim and aggressor cyberbullying did not explain in a statistically significant way the variance of

Table 2
Saturated Model: Cyberbullying and Grade Levels Predicting Motivation to Learn and DTIC Use

High School			Higher Education		
Dependent variable Controlled Motivation					
Independent variables	β (SE)	R^2	Independent variables	β (SE)	R^2
Cyberbullying Victim	.06 (.05)		Cyberbullying Victim	.04 (.05)	
Cyberbullying Aggressor	-.01 (.04)	.04*	Cyberbullying Aggressor	-.16* (.07)	.04
Cyberbullying Retaliator	.15** (.05)		Cyberbullying Retaliator	.12 (.07)	
Dependent Variable Autonomous Motivation					
Independent variables	β (SE)	R^2	Independent variables	β (SE)	R^2
Cyberbullying Victim	.10 (.06)		Cyberbullying Victim	.03 (.07)	
Cyberbullying Aggressor	.05 (.05)	.01	Cyberbullying Aggressor	-.15* (.07)	.03
Cyberbullying Retaliator	-.02 (.05)		Cyberbullying Retaliator	-.11 (.09)	
Dependent Variable Demotivation					
Independent variables	β (SE)	R^2	Independent variables	β (SE)	R^2
Cyberbullying Victim	.19* (.08)		Cyberbullying Victim	.32** (.12)	
Cyberbullying Aggressor	.22** (.07)	.10*	Cyberbullying Aggressor	-.01 (.03)	.12
Cyberbullying Retaliator	-.07 (.07)		Cyberbullying Retaliator	.04 (.16)	

Legend. SE = Standard Error

Note¹. Values of χ^2 , gl , $RMSEA$, CFI and TLI appear zeroed in both saturated models.

Note². Values in bold indicate statistically significant β , with $***p < .001$; $**p < .01$; $*p < .05$.

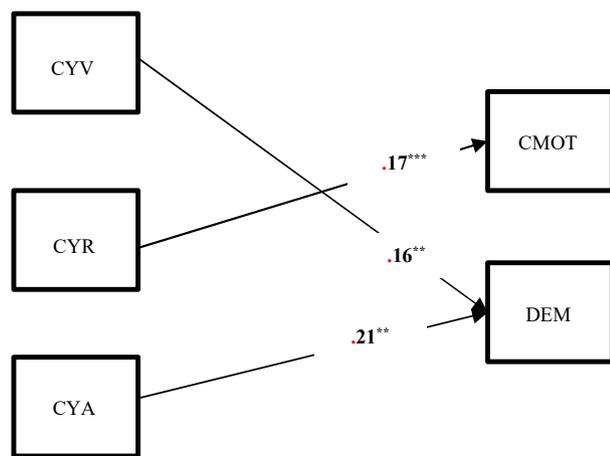


Figure 1. Cyberbullying Predicting Motivation to Learn and Use DTIC in High School

Legend. CYV = Cyberbullying Victim; CYA = Cyberbullying Aggressor; CYR = Cyberbullying Retaliator; CMOT = Controlled Motivation; DEM = Demotivation.

Note. in bold indicate statistically significant β , with $***p < .001$; $**p < .01$; $*p < .05$.

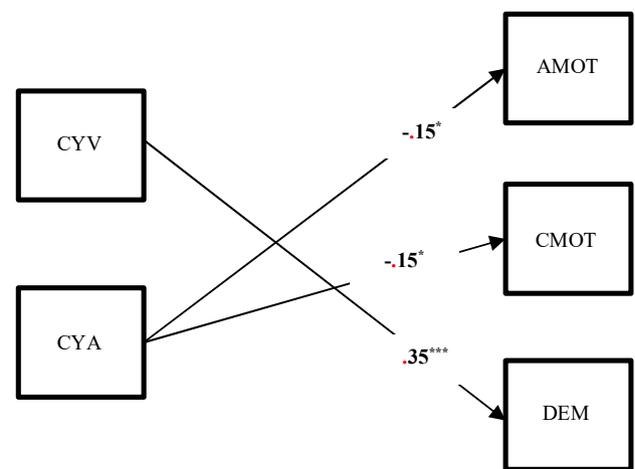


Figure 2. Cyberbullying Predicting Motivation to Learn and Use DTIC in Higher Education

Legend. CYV = Cyberbullying Victim; CYA = Cyberbullying Aggressor; AMOT = Autonomous Motivation; CMOT = Controlled Motivation; DEM = Demotivation.

Note. in bold indicate statistically significant β , being $***p < .001$; $**p < .01$; $*p < .05$.

the three factors of motivation to learn and use of DTIC: controlled motivation and autonomous motivation had $R^2 = .02$ ($p = .31$); and demotivation, $R^2 = .12$ ($p = .07$).

Finally, we analyzed the differences in motivation to learn and the use of DTIC and as cyberbullying practice in terms of educational levels. Table 3 shows statistically significant differences in controlled and autonomous motivation. High school students had a higher average of positions in controlled motivation ($z = -7.134$; $r = .25$), whereas higher education students had a higher average of positions in autonomous

motivation ($z = -3.390$; $r = .12$). Table 3 also shows that a statistically significant comparison effect was not identified in the variable level of education for demotivation.

Table 3 also shows a difference in education levels in the three types of roles involved in cyberbullying. High school students had a higher average of posts than those who attended higher education in cyberbullying victim ($z = -6.745$; $r = .24$), aggressor ($z = -3.755$; $r = .13$) and retaliator ($z = -7.923$; $r = .28$). The effect size of these comparisons qualifies as small.

Table 3
Group Comparison: Motivation to Learn and Use DTIC and Cyberbullying at Teaching Levels

Motivation	U	Teaching Levels	Md	M _{Rank}
Controlled	54512.500***	High school	6.00	454.26
		Higher education	5.00	333.05
Autonomous	66031.500***	High school	8.00	389.30
		Higher education	9.00	447.36
Demotivation	71946.000	High school	0	418.96
		Higher education	0	392.55
Cyberbullying	U	Teaching Levels	Md	M _{Rank}
Victim	55459.500***	High school	2.00	449.76
		Higher education	1.00	336.58
Aggressor	70053.500***	High school	0	423.07
		Higher education	0	386.41
Retaliator	55233.500***	High school	0	451.19
		Higher education	0	335.66

Legend. M_d = Median; M_{Rank} = Rank Means.

Note. Values in bold indicate statistically significant comparisons, *** $p < .001$; ** $p < .01$; * $p < .05$.

DISCUSSION AND CONCLUSION

The results were discussed in line with the presentation of the objectives of this research. First, were considered the results relevant to identifying the investigated students with the roles of cyberbullying. Corroborating the findings of studies such as those by researchers Rodriguez et al. (2018) and Slonje et al. (2012), the indices achieved highlighted a greater identification of high school and higher education students with the profile of cyberbullying victims. A possible interpretation for this result can be attributed to the difficulty of identifying the perpetrator, given that many students do not perceive themselves as aggressors as they consider themselves entitled to harass colleagues, especially those who judge them as inferior or somehow different (Mason, 2008; Tognetta & Bozza, 2012). However, when investigating the means and standard deviations, it should also be highlighted that the dimensions of cyberbullying presented reduced values given the size of the investigated sample, indicating low variability of scores among students, a fact that may limit a more precise identification of cyberbullying

profiles. Further research which directly addresses teaching contexts in which the practice of cyberbullying is observed (convenience samples) may provide more consistent results for the recognition of the roles played by students involved in virtual bullying situations.

In turn, high scores highlighted the autonomously motivated behavior of students from both levels of education to adopt digital technologies in study situations. Considering that young people are intrinsically motivated to use DTIC in their daily lives (Flanigan & Kiewra, 2018; Livingstone, 2011; Yot-Domínguez & Marcelo, 2017), it is assumed that such behavior can also be present when students use these digital technologies to study, as has already been seen in research by Arlia and Sumiati (2015), Fathali and Okada (2017), Sergis et al. (2018). It is noteworthy that when scoring for autonomous motivation, these students indicated, among other situations, that they feel satisfaction in looking for videos online because these resources favor the learning of contents taught in the classroom, which use instant messages

to discuss or ask for help about a studied topic, as by doing so, they will be able to improve/deepen their level of knowledge and, also, they find it pleasant to learn with available online information when studying to master a specific subject or carry out school/academic activities.

Regarding the results arising from the two levels of education, which surprisingly showed significant correlations and positive direction between autonomous motivation and controlled motivation, it is estimated that such result possibly expresses that the student perceives himself, to some degree, motivated to use DTIC to study. Thus, one of the possible challenges foreseen for educational institutions in the coming years will be to identify, study and invest in methodologies that seek to mediate educational processes with the various DTIC that permeate the daily lives of these students, promoting and strengthening the motivational quality of students to envision the use of these technologies for educational purposes. In this direction, Heafner (2004) adds that when faced with challenging academic tasks, the student who is motivated to adopt DTIC, especially with resources he or she is familiar with, feels more confident and tends to persist in carrying out the activity. Furthermore, by understanding that these Technologies, which are so common and present in their daily lives have a valuable potential to build and deepen new learning, students will be able to direct their motivation for the creative, fruitful, and responsible use of such digital resources (Arlia & Sumiati, 2015; Heafner, 2004; Sergis et al., 2018).

The implementation of these educational actions aimed at teaching the fruitful and healthy use of DTIC is preponderant, because, based on the results of the correlational analyzes found in this study, it is estimated that experiencing negative experiences with the use of digital technologies can lead the student to discredit the educational potential of those resources and neglect their use for educational activities. This estimate comes from the results that showed, between both high school and college students, that the demotivation to use digital technologies to learn was positively correlated with students who at some point suffered virtual intimidation (victim and retaliator).

Still, regarding the results pertinent to cyberbullying, the significant correlations with a positive direction found between the dimensions of this phenomenon are also noteworthy. The positive correlation between victim and aggressor is theoretically plausible when considering that this relationship may come from the feeling of self-preservation/self-protection shown by some perpetrators. In these situations, the aggressor sees himself/herself as a potential victim and acts in a violent/intimidating way, justifying that the adopted posture protects himself/herself from imminent threats or aggressions (Compton et al., 2014; Varjas et al., 2010). Thus, the high correlation between victim and retaliator can be observed when the victim searches the internet to act in an intimidating way retaliating against aggression or threat suffered, thus strengthening and perpetuating the

cycle of violence (Anderson et al., 2008). This retaliatory position among Brazilian students was also observed in the intercultural study developed by Souza e Simão (2017) when they found that Brazilian higher education students who had been victims of cyberbullying demonstrated a significant tendency to position themselves as aggressor's latter, while Portuguese university students sought to put an end to the series of online violence/bullying between victims and perpetrators.

This study also investigated the motivation functioning to study with the DTIC and cyberbullying considering the education levels. Comparative analyzes that sought to identify at the level of education students showed greater identification with cyberbullying showed that high school stood out, however, it was considerably low differential indices. In the literature, several studies highlighted that cyberbullying ranges from high school to university (Francisco et al., 2015; Gibb & Devereux, 2014; Watts et al., 2017; Webber & Ovedovitz, 2018; Zalaquett & Chatters, 2014). However, findings such as those obtained by researchers Gibb and Devereux (2014) reached similar results to those identified in this research, revealing that there was no significant decrease in the prevalence of cyberbullying when comparing the indexes that deal with this phenomenon in high school and university education. Other studies, in turn, highlighted a decrease in cyberbullying manifestations in university education compared to higher education (Watts et al., 2017; Zalaquett & Chatters). Researchers have attributed this reduction to the development of maturity, which commonly leads to increased awareness and empathy towards the victim.

Finally, the fulfillment of the last objective foreseen for this study is discussed arising from predictive investigations. Predictive investigations, however, pointed to both similarities and differences in the interference of roles involved in cyberbullying for the motivation to learn using DTIC. It was found that experiencing the role of victim or aggressor in high school can significantly discourage students from using digital technologies to perform tasks or learn about school content.

Likewise, among university students, it was found that students who start to suffer virtual harassment perceive themselves as more demotivated. In parallel, behaviors that are autonomously motivated to study are observed in the aggressor, which reduces intimidating practices. It should be noted that this research did not investigate the potential predictor of motivation to study with DTIC in the cyberbullying manifestations and that this information can contribute to elucidations about the investigated theme. It is expected that further studies will also consider this alternative in their investigations, overcoming the limitations of the present research and deepening the knowledge about these phenomena that are so present in the lives of students.

Again, the results suggest that it is significant the possibility that students who are involved in practices of virtual aggression/intimidation, that is, who experience

in a negative and/or inadequate way the communicational potential of these resources, come to disregard their use for healthy practices of interaction and/or learning. In this scenario, cyberbullying raises one more consequence as a result of its devastating practice: the exclusion of the student from situations that allow him to benefit from the many educational possibilities that the appropriate, productive, and responsible use of TDIC offers to the construction of new knowledge (Akbari et al., 2015; Fathali & Okada, 2017, Flanigan & Kiewra, 2018; Livingstone, 2011).

Due to the brutal consequences proclaimed by the literature to the emotional and psychological health of the student involved in cyberbullying, it is important to

emphasize the preponderance of interventional measures to combat this type of virtual violence. Such measures require, in many situations, joint actions by parents, teachers, psychologists, and the institutions involved, whether in high school or college. It is estimated that guiding students to use technologies in their studies can help them to perceive these resources' capacity for creative production and healthy interaction instead of alienated use or socially destructive practices, as is the case of cyberbullying. To manage so many technologies, young people need to exercise digital literacy. They need to be taught to develop the skills required to select, confront, create, and disseminate the various types of digital content in critically and conscientiously.

REFERENCES

- Anderson, C. A., Buckley, K. E., & Carnagey, N. L. (2008). Creating your own hostile environment: A laboratory examination of trait aggressiveness and the violence escalation cycle. *Personality and Social Psychology Bulletin*, 34(4), 462-473. <https://doi.org/10.1177/0146167207311282>
- Ansary, N. S. (2020). Cyberbullying: Concepts, theories, and correlates informing evidence-based best practices for prevention. *Aggression and violent behavior*, 50, 101343.
- Akbari, E., Pilot, A., & Simons, P. R. J. (2015). Autonomy, competence, and relatedness in foreign language learning through Facebook. *Computers in Human Behavior*, 48, 126-134. <https://doi.org/10.1016/j.chb.2015.01.036>
- Arlia, S., & Sumiati, A. (2015). Hubungan antara pemanfaatan media internet sebagai sumber belajar terhadap motivasi belajar siswa kelas x akuntansi SMK Negeri 46 Jakarta. *Journal Ilmiah Econosains*, 13(1), 15-27. <https://doi.org/10.21009/econosains.0131.02>
- Beluce, A. (2019). *Estudantes e as tecnologias digitais: relações entre cyberbullying e motivação para aprender*. (Doctoral Thesis in Education). Universidade Estadual de Londrina). <http://www.bibliotecadigital.uel.br/document/?code=vtls000230793>
- Beluce, A. C., Ronqui, D. D., & de Oliveira, K. L. (2021). Cyberbullying entre estudantes: um modelo para compreensão. *Revista de Instrumentos, Modelos e Políticas em Avaliação Educacional*, 2(2), e021013-e021013.
- Beluce, A., Oliveira, K. L., Almeida, L. S., & Baptista, M. N. (2021). Escala de motivação para aprender com o uso das TDIC (EMA – TIDIC). *Revista Psico-USF*, 26(spe), 45-58. <https://doi.org/10.1590/1413-8271202126nesp06>
- Bzuneck, J. A. (2010). Como motivar os alunos: sugestões práticas. In: E. Boruchovitch, J. A. Bzuneck & S. E. Rufini (Eds.), *Motivar para aprender: aplicações no contexto educativo* (pp. 11-42). Vozes.
- Blaschke, L. M. (2017). Self-determined Learning (Heutagogy) and Digital Media Creating integrated Educational Environments for Developing Lifelong Learning Skills. *The Digital Turn in Higher Education*, 129-140. https://doi.org/10.1007/978-3-658-19925-8_10
- Bzuneck, J. A., & Guimarães, S. E. R. (2010). A promoção da autonomia como estratégia motivacional na escola: uma análise teórica e empírica. In E. Boruchovitch, J. A. Bzuneck. & S. E. R. Guimarães (Orgs.). *Motivar para aprender: aplicações no contexto educativo* (pp. 13-42). Vozes.
- Caetano, A. P., Freire, I., Veiga Simão, A. M., Martins, M. J.D., & Pessoa, M. T. (2016). Emoções no cyberbullying: um estudo com adolescentes portugueses. *Educação e Pesquisa*, 42(1), 199-212. <https://doi.org/10.1590/S1517-9702201603138125>
- Chao, C.-M., & Yu, T.-K. (2017). Associations among Different Internet Access Time, Gender and Cyberbullying Behaviors in Taiwan's Adolescents. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.01104>
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Compton, L., Campbell, M. A., & Mergler, A. (2014). Teacher, parent and student perceptions of the motives of cyberbullies. *Social Psychology of Education*, 17(3), 383-400. <https://doi.org/10.1007/s11218-014-9254-x>
- Costa, M. R. P., Tomczyk, Ł., Teixeira, M. C. T. V., & Martins, V. F. (2021). Cyberbullying: The state of the art on studies using psychometric instruments in Brazil. In 2021 16th Iberian Conference on Information Systems and Technologies (CISTI) (pp. 1-6). IEEE
- Deci, E. L. & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. https://doi.org/10.1207/s15327965pli1104_02
- Erişti, B., & Akbulut, Y. (2019). Reactions to cyberbullying among high school and university students. *The Social Science Journal*, 56(1), 10-20.
- Francisco, S. M., Simão, A. M. V., Ferreira, P. C., & das Dores Martins, M. J. (2015). Cyberbullying: The hidden side of college students. *Computers in human behavior*, 43, 167-182. <https://doi.org/10.1016/j.chb.2014.10.045>
- Fathali, S., & Okada, T. (2017). A self-determination theory approach to technology-enhanced out-of-class language learning intention: A case of Japanese EFL learners. *International Journal of Research Studies in Language Learning*, 6(4), 53-64. <https://doi.org/10.5861/ijrsl.2016.1607>
- Flanigan, A. E., & Kiewra, K. A. (2018). What college instructors can do about student cyber-slacking. *Educational Psychology Review*, 30(2), 585-597. <https://doi.org/10.1007/s10648-017-9418-2>
- Garaigordobil, M. (2017). Conducta antisocial: conexión con bullying/cyberbullying y estrategias de resolución de conflictos. *Psychosocial Intervention*, 26(1), 47-54. <https://doi.org/10.1016/j.psi.2015.12.002>
- Gibb, Z. G., & Devreux, P. G. (2014). Who does that anyway? Predictors and personality correlates of cyberbullying in college. *Computers in Human Behavior*, 38, 8-16. <https://doi.org/10.1016/j.chb.2014.05.009>
- Goss-Sampson, M. A. (2020). *Statistical Analysis in JASP 0.14: A Guide for Students*. <https://jasp-stats.org/jasp-materials/>
- Heafner, T. (2004). Using technology to motivate students to learn social studies. *Contemporary Issues in Technology and*

- Teacher Education*, 4(1), 42-53. https://www.researchgate.net/publication/255043546_Using_Technology_to_Motivate_Students_to_Learn_Social_Studies
- Huang, C. L., Zhang, S., & Yang, S. C. (2020). How students react to different cyberbullying events: Past experience, judgment, perceived seriousness, helping behavior and the effect of online disinhibition. *Computers in Human Behavior*, 110, 106338.
- Lee, M. K. O., Cheung, C. M. K., & Chen, Z. (2005). Acceptance of Internet-based learning medium: the role of extrinsic and intrinsic motivation. *Information & Management*, 42(8), 1095-1104. <https://doi.org/10.1016/j.im.2003.10.007>
- Livingstone, S. (2011). Internet literacy: a negociação dos jovens com as novas oportunidades on-line. *MATRIZES*, 4(2), 11-42. <https://doi.org/10.11606/issn.1982-8160.v4i2p11-42>
- Macaulay, P. J., Betts, L. R., Stiller, J., & Kellezi, B. (2022). Bystander responses to cyberbullying: The role of perceived severity, publicity, anonymity, type of cyberbullying, and victim response. *Computers in Human Behavior*, 131, 107238.
- Mallmann, C. L., Macedo-Lisboa, C. S., & Zanatta, C. T. (2018). Cyberbullying e Estratégias de Coping em Adolescentes do Sul do Brasil. *Acta Colombiana de Psicología*, 21(1), 13-43. <https://dx.doi.org/10.14718/acp.2018.21.1.2>
- Marôco, J. (2014). *Análise de equações estruturais: Fundamentos teóricos, software & aplicações*. ReportNumber.
- Mason, K. L. (2008). Cyberbullying: A preliminary assessment for school personnel. *Psychology in the Schools*, 45(4), 323-348. <https://doi.org/10.1002/pits.20301>
- Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide*. (6th ed.). Muthén & Muthén.
- Oliveira, J. C. C. (2016). *Cyberbullying entre adolescentes usuários de internet: um estudo de levantamento on-line* (Masters Dissertation). Universidade Federal de Juiz de Fora. <https://repositorio.ufjf.br/jspui/handle/ufjf/1395>
- Patchin, J. W., & Hinduja, S. (2015). Measuring cyberbullying: Implications for research. *Aggression and Violent Behavior*, 23, 69-74.
- Pérez, E., Medrano, L. A., & Rosas, J. S. (2013). El Path Analysis: conceptos básicos y ejemplos de aplicación. *Revista Argentina de Ciencias del Comportamiento*, 5(1), 52-66. <https://doi.org/10.32348/1852.4206.v5.n1.5160>
- Peters, D., Calvo, R. A., & Ryan, R. M. (2018). Designing for motivation, engagement and wellbeing in digital experience. *Frontiers in Psychology*, 9, 797. <https://doi.org/10.3389/fpsyg.2018.00797>
- Rashid, T., & Asghar, H. M. (2016). Technology use, self-directed learning, student engagement and academic performance: Examining the interrelations. *Computers in Human Behavior*, 63, 604-612. <https://doi.org/10.1016/j.chb.2016.05.084>
- Reyes, J. I. O., & Bañales, D. L. G. (2016). El ciberacoso y su relación con el rendimiento académico. *Innovación Educativa*, 16(71), 17-38. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-26732016000200017&lng=es&tlng=es
- Rodríguez, A. C. R., Noriega, J. A. V., & Hernández, G. B. (2018). Desarrollo de un instrumento para medir cibervictimización en adolescentes. *Informes Psicológicos*, 18(2), 189-207. <https://doi.org/10.18566/infpsic.v18n2a10>
- Ryan, R. M. & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications. <https://doi:10.1521/978.14625/28806>
- Slonje, R., Smith, P. K., & Frisén, A. (2012). Processes of cyberbullying, and feelings of remorse by bullies: A pilot study. *European Journal of Developmental Psychology*, 9(2), 244-259. <https://doi:10.1080/17405629.2011.643670>
- Souza, S. B., Simão, A. M., & Caetano, A. P. (2014). Cyberbullying: Percepções acerca do Fenômeno e das Estratégias de Enfrentamento. *Psicologia: Reflexão e Crítica*, 27(3), 582-590. <https://doi.org/10.1590/1678-7153.201427320>
- Souza, S., & Simão, A. (2017). Clima universitário e cyberbullying: um estudo com estudantes do Brasil e Portugal. *Revista @ mbienteeducação*, 10(2), 181 – 196. <https://doi.org/10.26843/ae19828632v10n22017p181a196>
- Stevens, K. J., Guo, Z., & Li, Y. (2018). Typology and Hierarchy of Students' Motivations to Use Technology in Learning. *Australasian Journal of Information Systems*, 22, 1-30. <https://doi:10.3127/ajis.v22i0.1492>
- Tognetta, L. R. P., & Bozza, T. C. L. (2012). Cyberbullying: um estudo sobre a incidência do desrespeito no ciberespaço e suas relações com as representações que adolescentes têm de si. *Nuances: Estudos Sobre Educação*, 23(24), 162-178. <https://doi:10.14572/nuances.v23i24.1896>
- Twenge, J.M. (2018). *iGen: Por que as crianças superconectadas de hoje estão crescendo menos rebeldes, mais tolerantes, menos felizes e completamente despreparadas para a idade adulta?* Tradução de Thaís Costa. nVersos.
- Varjas, K., Talley, J., Meyers, J., Parris, L., & Cutts, H. (2010). High school students' perceptions of motivations for cyberbullying: An exploratory study. *Western Journal of Emergency Medicine*, 11(3), 269. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2941365/>
- Watts, L. K. et al. (2017). Cyberbullying in higher education: A literature review. *Computers in Human Behavior*, 69, 268-274. <https://doi:10.1016/j.chb.2016.12.038>
- Webber, M. A., & Ovedovitz, A. C. (2018). Cyberbullying among college students: a look at its prevalence at a US Catholic University. *International Journal of Educational Methodology*, 4(2), 95-107. <https://doi:10.12973/ijem.4.2.101>
- Yot-Domínguez, C., & Marcelo, C. (2017). University students' self-regulated learning using digital technologies. *International Journal of Educational Technology in Higher Education*, 14(1), 1-18. <https://doi.org/10.1186/s41239-017-0076-8>
- Zalaquett, C. P., & Chatters, S. J. (2014). Cyberbullying in College: Frequency, Characteristics, and Practical Implications. *SAGE Open*. 4(1), 1-8 <https://doi.org/10.1177/2158244014526721>