Prevalence of online reading among high school students in Qatar: Evidence from the Programme for International Student Assessment 2009

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ABSTRACT

Recent research has suggested presence of a significant relationship between prevalence of online reading and reading literacy. In this study we examined the prevalence of online reading among 15-year old students in Qatar using a nationally representative sample of 8,089 students. Bivariate and multivariate analyses were conducted at the item and scale levels in order to understand the relationship of online reading activities with computer use for schoolwork and entertainment, and demographic differences such as gender, grade and socioeconomic status. Our results suggest small but significant differences in mean prevalence of online reading between boys and girls. Prevalence of online reading was found to be strongly associated with both entertainment- and schoolwork-related use of computers at home but weakly associated with computer use at school. Implications were discussed.

Keywords: Online reading; Qatar; PISA; analysis of covariance; ICT; computer use

INTRODUCTION AND THEORETICAL FRAMEWORK

Recent research has suggested existence of an explanatory relationship between prevalence of online reading and reading literacy (Gil-Flores, Torres-Gordillo, & Perera-Rodríguez, 2012; Hsieh & Dwyer, 2009; Lee & Wu, 2013; Moyer, 2011; Pfost, Dörfler, & Artelt, 2013; Silva, 2009) even though in many cases that relationship is not direct or potentially as strong as that for traditional (hardcopy) reading (Baron, 2013; Coiro, 2012; Robertson, 2006). Hsieh and Dwyer (2009) for example used the theory of self-regulated learning to explore the indirect effect of online reading on reading literacy within context of an intermediary role of meta-cognitive reading strategies. Using a sample of 169 undergraduate students they showed that online reading had a significant effect on learning objectives. A conceptually similar study by Lee and Wu (2013) based on PISA 2009 used nationally representative samples from 15 countries and showed that not all types of online reading activities contributed similarly to reading literacy. Specifically, they found that information seeking activities led to an improvement in reading literacy while social entertainment activities worsened it. This finding was also supported by Gil-Flores, Torres-Gordillo, and Perera-Rodríguez (2012) who focused on the Spanish sample from PISA 2009 and showed that information searching activities resulted in better digital reading performance as compared to online social activities. On the other hand, in contrast to the findings of Hsieh and Dwyer (2009) and Lee and Wu (2013), a German study by Pfost, Dörfler, and Artelt (2013) based on a sample of 1,226 secondary school students found evidence that supported existence of a negative relationship between online reading and reading achievement. The same study also suggested that traditional book reading remained a significant and positively correlated predictor of reading achievement. Regardless of whether the effect of online reading on reading literacy is direct or indirect, since the ultimate aim of most educational policies directed at the individual level is to improve literacy, from an empirical point of view it is important to examine significant determinants of such literacy. Thus, given this reasoning, prevalence of online reading as a potential predictor of reading literacy on its own merits an in-depth examination.

An obvious predictor of online reading among students is frequency of computer use. However, not all types of computer use involve online reading. For example, when a student uses a computer to play a single-player game, little or no online reading may be involved. On the other hand, activities such as reading online news, reading emails, or chatting online cannot be accomplished without involving some degree of online reading (Gil-Flores, Torres-Gordillo, & Perera-Rodríguez, 2012). Similarly, when online reading does take place not all of it may contribute to reading literacy. One may categorize online reading activities into two distinct groups: social entertainment activities such as interacting with social networking websites or chatting online that contribute little to reading literacy (Pfost, Dörfler, & Artelt, 2013), and information-seeking activities such as using an online dictionary or searching online information to learn about a particular topic, that contribute to such literacy (Lee & Wu, 2013).

It is also important to consider whether online reading activities occur at home or school because the nature of such activities may not be the same at the two locations. For example, when at school students may have limited opportunities to engage in activities such as chatting online, reading personal emails, or searching for information not directly related to schoolwork. An increasing body of recent literature suggests that students' use of computers at home has surpassed such use at school with students reporting frequent use of computers for online activities such as reading email or searching the internet for information (Ilömaki, 2011; Kent & Facer, 2004; Lahtinen, 2012; OECD, 2005; Slewyn, 1998). Computer use at home is not necessarily restricted to entertainment activities such as playing games, online chatting etc. but also relates to school-related activities such as completing homework, or using online chatting or email to communicate with teachers and classmates. This makes it important to distinguish between computer use at home for school-related work and that for entertainment. Past studies that have investigated student use of computers at home and school in context of demographic differences, and have reported significant effects for factors such as age, gender, grade, prior experience with computers, socioeconomic status etc., include Arch & Cummins (1989), Comber, Colley, Hargreaves, & Dorn (1997), Jackson, Ervin, Gardner, & Schmitt (2001), Kent & Facer (2004), Mitra et al. (2000), Miura (1987), Singh (2001), and Taipale (2012). In addition to their effect on computer use demographic differences between students may also play an important role in moderating the relationship between prevalence of online reading and reading literacy (Gil-Flores, Torres-Gordillo, & Perera-Rodríguez, 2012; Liu & Huang , 2007; Pfost, Dörfler, & Artelt, 2013).

In this study we examine the prevalence of online reading activities such as reading online news, searching online information to learn about a particular topic, reading emails etc. among students in context of demographic factors such as gender, grade, and socioeconomic status, and use of computers for entertainment and school-work. Given the potential explanatory link between online reading and reading literacy as suggested by previous research, such examination has the potential to add to our understanding of the determinants of prevalence of online reading which in turn can contribute to the improvement of reading literacy among students. For this purpose we use a nationally representative sample from the Qatari portion of Programme for International Student Assessment 2009. To our knowledge no other study has conducted this kind of analysis for countries of the Persian Gulf in general and for Qatar in particular. We believe that such country-specific analyses are appropriate and needed because given the often significant differences in social, political, and economic dimensions findings from one country are not readily generalizable to others, and because given the rapid advances in information and communication technology (ICT) over time, results of older studies tend to lose their relevance quickly. For instance, with respect to ICT what was relevant ten years ago in Italy may not be relevant today in China.

In the next section of this paper we provide a description of our method, followed by results of statistical analyses, and a discussion including conclusions, implications, study limitations, and suggestions for future research.

METHOD

Participants and Data Collection

The data for this study came from student portion of the Program for International Student Assessment (PISA) 2009 (OECD, 2012b). PISA is an international literacy assessment of 15-year old students that is supervised by OECD and administered in participating countries by their respective national educational authorities. In Qatar administration of PISA was overseen by the Supreme Education Council which is the official body responsible for management and control of all levels of education in this country.

Cases were selected in a two stage clustered stratified random sampling process where a random sample of schools in Qatar was selected in the first stage and a random sample of students was drawn from each selected school in the second stage. The resulting sample was nationally representative. The target population was all 15-year old students enrolled in public and private schools in Qatar in 2009. The ICT-related data were collected from students in the form of an ICT survey questionnaire that included questions about ICT availability at home and school, and students' use of and attitudes towards ICT (OECD, 2008; OECD, 2009; OECD, 2012a).

The sample for Qatar comprised of 9,078 students which shrunk to 8,089 after listwise deletion of cases with missing or invalid values. Of the 8,089 students 4,194 were girls (51.8%), 99 were in grade 7 (1.2%), 263 in grade 8 (3.3%), 1,062 in grade 9 (13.1%), 5,123 in grade 10 (63.3%), 1,506 in grade 11 (18.6%), and 35 in grade 12 (.4%). Since this is a sample of 15-year old students there was very little variability in age (M = 15.74, SD = 0.29).

Measures

The following measures and variables were used in the statistical analyses performed for this study.

Prevalence of online reading

This is our primary variable of interest in this study and is based on seven underlying items that measure the frequency of a student's computer use for online reading-related activities. This measure is based on seven underlying items which had a reliability of .85 in our sample. A sample item included, " How often are you involved in reading online news?" The response categories were 1 (don't know what it is), 2 (never or almost never), 3 (several times a month), 4 (several times a week), and 5 (several times a day). The inter-item correlations for this scale ranged between .32 and .68 (M = .46, SD = .08). Responses for the seven items were averaged into a single score for each student. Mean, standard deviation, and the percentage of responses for each category of the seven items is presented in Table 1. The response pattern shows that most students engage in reading activities at least several times a week. These activities include reading emails (65.7%), chatting online (68.7%), reading online news (51.9%), using an online dictionary or encyclopedia (49.1%), searching for information to learn about a particular topic (64.3%), taking part in online group discussion or forums (42.4%), and searching for particular information online (43.5%). The prevalence of online reading scale was standardized to have a

mean of 0 and standard deviation of 1 with standardized scores ranging between -2.94 and 1.65. The sample density function for prevalence of online reading is presented in Figure 1. The distribution is approximately normal which suggests appropriateness of this measure for procedures such as *t* tests and analysis of covariance (Tabachnick & Fidell, 2007).

In order to differentiate between entertainment and school use of computers we used three measures of computer use, computer use at home for entertainment, computer use at home for school-related tasks, and computer use at school.
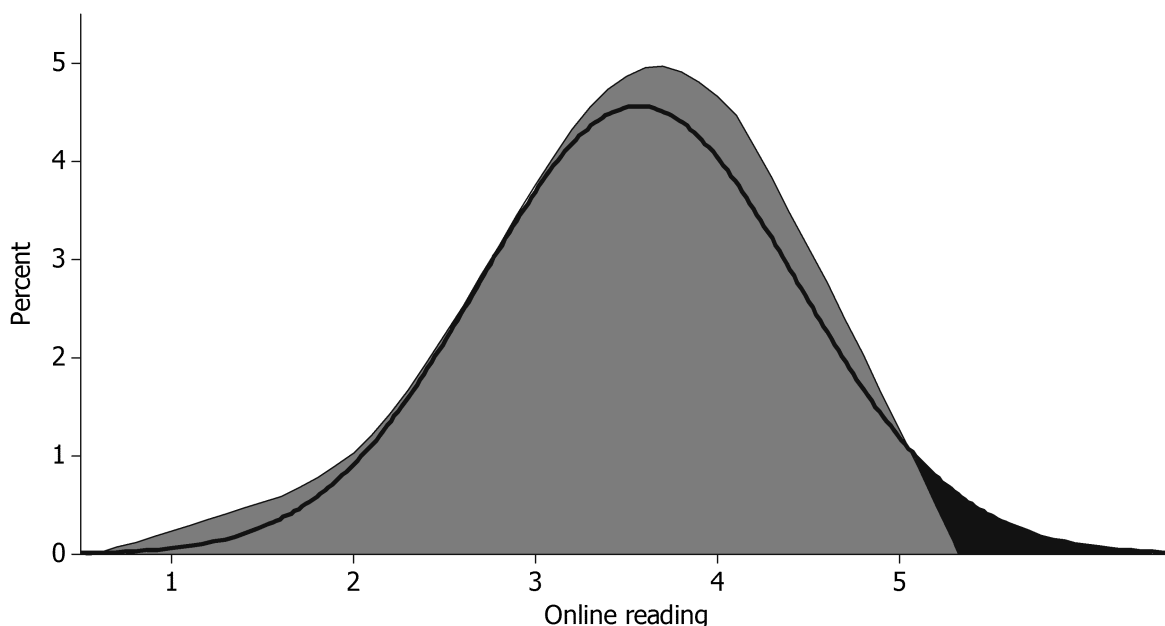
Computer use at home for entertainment

This measure is based on eight questions that asked a student about the frequency of computer use for various entertainment activities at home. A sample item included, "How often do you use a computer to publish and maintain a personal website or blog?" The response choices were 1 (never or hardly ever), 2 (once or twice a month), 3 (once or twice a week), and 4 (almost every day). For our sample the reliability of this scale was .84 and the inter-item correlations ranged between .23 and .68 (*M* = .41, *SD* = .13). This scale was standardized to have a mean of 0 and standard deviation of 1 with standardized scores ranging between -2.83 and 2.43.

Table 1: Descriptive Statistics and Response Category Percentages for Online Reading Activities

Scale/Item	*M*	*SD*	Don't know what it is	Never or almost never	Several times a month	Several times a week	Several times a day
How often are you involved in the following reading activities?*	3.56	1.19	5.8	16.1	23.1	26.2	28.9
1. Reading emails	3.78	1.25	7.5	9.8	17.0	28.1	37.6
2. Chat online (e.g. MSN)	3.94	1.27	5.2	13.6	12.5	19.7	49.0
3. Reading online news	3.50	1.19	4.6	18.9	24.6	26.2	25.7
4. Using an online dictionary or encyclopaedia (e.g. Wikipedia)	3.40	1.19	7.3	15.5	28.1	28.3	20.8
5. Searching online information to learn about a particular topic	3.78	1.05	3.7	7.0	25.1	36.2	28.1
6. Taking part in online group discussions or forums	3.23	1.27	6.5	29.5	21.5	19.4	23.0
7. Searching for practical information online (e.g. schedules, events, tips, recipes)	3.32	1.14	5.7	18.1	32.7	25.3	18.2

Note. *n* = 8,089. Percentages for some items may not sum to 100 due to rounding. All figures based on unstandardized scale and items.
*This row contains mean percentages for the seven items.

Figure 1: *Sample density function of online reading (light fill) superimposed on the normal density curve (dark fill).*

Computer use at home for school-related tasks

This measure is based on five questions that asked a student about the frequency of computer use for school-related work at home. A sample item included, "How often do you use email for communication with teachers and submission of homework or other schoolwork?" The response choices were 1 (never or
hardly ever), 2 (once or twice a month), 3 (once or twice a week), and 4 (almost every day). For our sample the reliability of this scale was .79 and the inter-item correlations ranged between .27 and .56 (*M* = .43, *SD* = .11). This scale was standardized to have a mean of 0 and standard deviation of 1 with standardized scores ranging between -2.30 and 2.53.

Computer use at school

This measure is based on nine questions that asked a student about the frequency of computer use for school-related work at school. A sample item included, "How often do you use a computer for doing individual homework on a school computer?" The response choices were 1 (never or hardly ever), 2 (once or twice a month), 3 (once or twice a week), and 4 (almost every day). For our sample the reliability of this scale was .91 and the inter-item correlations ranged between .42 and .67 (*M* = .52, *SD* = .06). This scale was standardized to have a mean of 0 and standard deviation of 1 with standardized scores ranging between -1.34 and 3.19.

Demographic controls

We used grade, gender, and socioeconomic status (SES) to control for demographic differences among students. Grade had six levels (grades 7 through 12) and gender had two categories, male and female. Although grade is not a variable of direct interest in this study we have included

it as a control variable as it is reasonable to expect greater proficiency and frequency of computer use at higher grade levels as compared to lower levels. PISA reports socioeconomic status as an index based on several sub-scales such as parental education, parental occupation, cultural possessions, family wealth, and home education resources. The Cronbach's Alpha for this index in our sample was .56 (OECD, 2012a). After standardization socioeconomic status ranged between -4.24 and 2.62 in our sample (M = 1, SD = 0). In addition to these three demographic variables we considered using age as an additional control. However, the effect was age was universally insignificant in all of our analyses. This is not surprising considering the fact that PISA is a survey of 15-year old students which results in very small variation in this variable in our sample. For this reason we decided to exclude age from the set of demographic control variables.

Analytical Method

We investigated the prevalence of online reading at both bivariate and multivariate levels. In our bivariate analysis we examined the relationship of online reading individually with the computer use measures and demographic control variables. For gender we conducted independent samples *t* tests in order to evaluate the difference in online reading between boys and girls. For socioeconomic status and the three measures of computer use we looked at their pairwise correlations with prevalence of online reading. For multivariate treatment we used grade and gender as factors, and socioeconomic status and the three measures of computer use as covariates in an analysis of covariance model with prevalence of online reading as the dependent variable. R^2 for this model was computed as a measure of goodness of fit and effect size.

For all statistical analyses we evaluated the validity of model assumptions and used normalized sampling weights. Cohen's (1992) recommended guidelines were used for interpretation of effect sizes, all tests of significance were evaluated at the 5% level of significance, and residuals from estimated models were analyzed for any sign of problems that could interfere with generalizability of our statistical results. All analyses were conducted with SPSS 20.0.

RESULTS

Bivariate Results

In order to test the relationship between prevalence of online reading and gender, we performed independent samples *t* tests on prevalence of online reading with gender as the independent variable (see Table 2). Scale-level results indicated a significant overall difference in prevalence of online reading between boys and girls (ΔM = .07, t = 3.29, p = .001) with boys outperforming girls. Item-level results showed a similar (but not identical) general trend with boys' reporting significantly higher mean prevalence of online reading as compared to girls in activities such as reading emails (ΔM = .10, t = 3.54, p < .001), chatting online (ΔM = .11, t = 3.85, p < .001), using an online dictionary or encyclopaedia (ΔM = .11, t = 4.16, p < .001), searching online information to learn about a particular topic (ΔM = .16, t = 6.84, p < .001), and searching for practical information online (ΔM = .16, t = 6.33, p < .001). The only activity for which girls' surpassed boys was in taking part in online group discussions or forums (ΔM = .16, t = 5.81, p < .001). There was no significant mean difference between boys and girls in reading online news (ΔM = .03, t = 0.94, p = .349). Cohen's *d* was calculated for each *t* test as a measure of effect size. Their interpretation is based on guidelines suggested by Cohen (1992).

Table 2: *Results of Independent Samples t Tests for Mean Differences in Online Reading* Activities between Boys and Girls

Scale/Item	t	p	ΔM (Boys - Girls)	95% CI	$\|d\|$*	Effect size interpretation[†]
How often are you involved in the following reading activities?[‡]	3.29	.001	0.07	(.03, .12)	.07	Small
1. Reading emails	3.54	< .001	0.10	(.04, .12)	.08	Small
2. Chat online (e.g. MSN)	3.85	< .001	0.11	(.04, .13)	.09	Small
3. Reading online news	-0.94	.349	-0.03	(-.06, .02)	.02	-
4. Using an online dictionary or encyclopaedia (e.g. Wikipedia)	4.16	< .001	0.11	(.05, .14)	.09	Small
5. Searching online information to learn about a particular topic	6.84	< .001	0.16	(.11, .20)	.15	Small
6. Taking part in online group discussions or forums	-5.81	< .001	-0.16	(-.17, -.09)	.13	Small
7. Searching for practical information online (e.g. schedules, events, tips, recipes)	6.33	< .001	0.16	(.10, .18)	.14	Small

Note. n = 8,089, df = 8,087. All figures based on standardized scale and items.
*Cohen's d based on pooled standard deviation.
[†]Interpretation based on Cohen (1992). Insignificant mean differences not interpreted.
[‡]This row contains scale statistics.

In order to investigate the relationship between prevalence of online reading, socioeconomic status, and the three computer use measures we examined the pairwise correlation matrix of these variables (see Table 3). The pattern of correlations suggested statistically significant weak to moderate correlations among the four predictors ranging from .07 between computer use at school and SES, to .50 between computer use at home for entertainment and computer use at home for school-related tasks. Prevalence of online reading had a moderate association with SES, r = .29, p < .001, computer use at home for entertainment, r = .56, p < .001, and computer use at home for school-related tasks, r = .42, p < .001, and a weak association with computer use at school, r = .11, p < .001.

Multivariate Results

The analysis of covariance results for prevalence of online reading as a function of gender, grade, SES, and the three computer use variables and their interactions are presented in Table 4. These results suggest that holding all else constant, there is a significant mean difference in prevalence of online reading between boys and girls (F = 78.5, p < .001), and among the six grade levels (F = 19.6, p < .001). In addition, socioeconomic status and all three computer use variables individually have a significant effect on prevalence of online reading (SES: F = 142.07, p < .001; computer use at home for entertainment: F = 1825.75, p < .001; computer use at home for school-related tasks: F = 355.36, p < .001; computer use at school: F = 12.08, p < .001). More

specifically, the effect of computer use at home for school-related tasks on prevalence of online reading depends on computer use at home for entertainment (*F* = 45.21, *p* < .001) but not on computer use at school (*F* ~ 0, *p* = .989), and the effect of computer use at school on prevalence of online reading depends on computer use at home for entertainment (*F* = 16.26, *p* < .001). The adjusted R^2 for this model was .39 suggesting that approximately two-fifths of the variation in prevalence of online reading can be explained by the predictors included in the model. Using Cohen's (1992) guidelines this translates into the multiple correlation index of population effect size, f^2 = .63 which is considered large.

DISCUSSION AND CONCLUSIONS

In this study we examined the prevalence of online reading among 15-year old students in Qatar using a nationally representative sample of 8,089 students. Bivariate and multivariate analyses were conducted at the item and scale levels in order to understand the relationship of online reading activities with computer use for schoolwork and entertainment, and demographic differences such as gender, grade and socioeconomic status. Our results suggest small but significant mean differences in prevalence of online reading between boys and girls in line with prior studies such as Jackson et al. (2001), and Lee and Wu (2013). Online reading was found to be strongly associated with both entertainment- and schoolwork-related use of computers at home but weakly associated with computer use at school supporting the findings of previous studies such as Gil-Flores et al. (2012) and Lee and Wu (2013). Our multivariate model was able to explain approximately 39% of the total variation in prevalence of online reading. The similarity of general results from our bivariate and multivariate analyses lends support to the robust nature of our findings.

The results from our statistical analyses have a number of implications for researchers and practitioners. First, in general boys tend to participate more than girls in various types of online reading activities ranging from reading emails and chatting to searching for practical information online. Although the mean differences between boys and girls are small they are significant and tend to be in the same direction. The only case where girls' participation exceeded that of boys was for taking part in online group discussions or forums and the only case where the difference was not significant was for reading online news. The obvious implication here is that there is scope to improve the diversity of online reading activities among girls. What is not so obvious is that if girls are not spending as much time as boys on online reading activities then towards what end is that extra time diverted. Given the suggestion in recent literature (e.g. Cheema, in press; Guarino & Tanner, 2012) that in Qatar girls tend to outperform boys in areas of literacy such as reading, science, and, to some extent, mathematics, one could make a case that perhaps girls are spending more time on activities that are more directly related to academic achievement (such as reading textbooks or other assigned readings, completing homework etc.) as compared to spending more time on online reading activities. This notion gains support when we consider that boys tend to spend significantly more time on online reading activities as compared to girls even after partialling out the effect of other computer-related uses such as computer use at home for entertainment, computer use at home for school-related tasks, and computer use at school, as suggested by our multivariate results.

Table 3: *Means, Standard Deviations, and Correlations for Online Reading, Socioeconomic Status, and Various Types of Computer use*

	M	SD	1	2	3	4	5
					r^*		
1. Online reading	0	1	-				
2. Socioeconomic status	0	1	.29	-			
3. Computer use at home for entertainment	0	1	.56	.26	-		
4. Computer use at home for school-related tasks	0	1	.42	.20	.50	-	
5. Computer use at school	0	1	.11	.07	.22	.45	-

Note. n = 8,089.
*All correlations significant, $p < .001$.

**Table 4:** *ANCOVA Results for Prevalence of Online Reading*

Source of Variance	SS	df	MS	F	p	η_p^2
Main effects:						
Grade	60.21	5	12.04	19.6	< .001	0.01
Gender	48.23	1	48.23	78.5	< .001	0.01
Socioeconomic status	87.29	1	87.29	142.07	< .001	0.02
Computer use at home for entertainment (X_1)	1121.73	1	1121.73	1825.75	< .001	0.18
Computer use at home for school-related tasks (X_2)	218.33	1	218.33	355.36	< .001	0.04
Computer use at school (X_3)	7.42	1	7.42	12.08	< .001	~0
Interactions:						
X_1 x X_2	27.77	1	27.77	45.21	< .001	0.01
X_1 x X_3	9.99	1	9.99	16.26	< .001	~0
X_2 x X_3	~0	1	~0	~0	0.989	~0
Error	5043.54	8209	0.61			
Total	8251.37	8222				

Note. n = 8,089. Adjusted R^2 = .388.

Second, some of the strongest correlations for prevalence of online reading were observed with computer use at home for entertainment and with computer use at home for school-related tasks, while a very weak correlation was observed between prevalence of online reading and computer use at school. This suggests that for students most of their online reading takes place at home and not at school. This observation is in line with prior research and makes intuitive sense because while at school there is a limited opportunity to participate in most popular online activities among students such as reading emails or chatting online. What is more interesting is that the partial effect of computer use at home for entertainment on prevalence of online reading was more than four times the similar effect of computer use at home for school-related tasks. This means that most online reading activities take place in context of non-school-related computer

use. This is an important implication for school administrators and teachers interested in improving the diversity and prevalence of online reading activities among students and points towards a need to incorporate online reading elements in both school-related tasks completed at school and those assigned as homework.

Finally, results from our multivariate analyses suggest the presence of some significant interaction effects. More specifically, the effect on prevalence of online reading was moderated by computer use at home for entertainment for both computer use at school and computer use at home for school-related tasks. These two interaction effects are presented in Figures 2 and 3 based on parameter estimates corresponding to our analysis of covariance model while holding all variables not included in the plots at their average levels. Figure 2 shows the effect of computer use at home for school-related tasks on prevalence of online reading at three different levels of computer use for entertainment, at one standard deviation below the mean (low), at the mean (medium), and at one standard deviation above the mean (high). At all three levels of computer use for entertainment, there is a positive relationship between prevalence of online reading and computer use at home for school-related tasks. However, the three regression lines are not parallel. As the level of computer use for entertainment increases the slope of the regression line decreases indicating that the effect of computer use at home for school-related tasks on prevalence of online reading weakens. This makes intuitive sense because, with all else held constant, as students spend more time on entertainment there is lesser time available for homework.
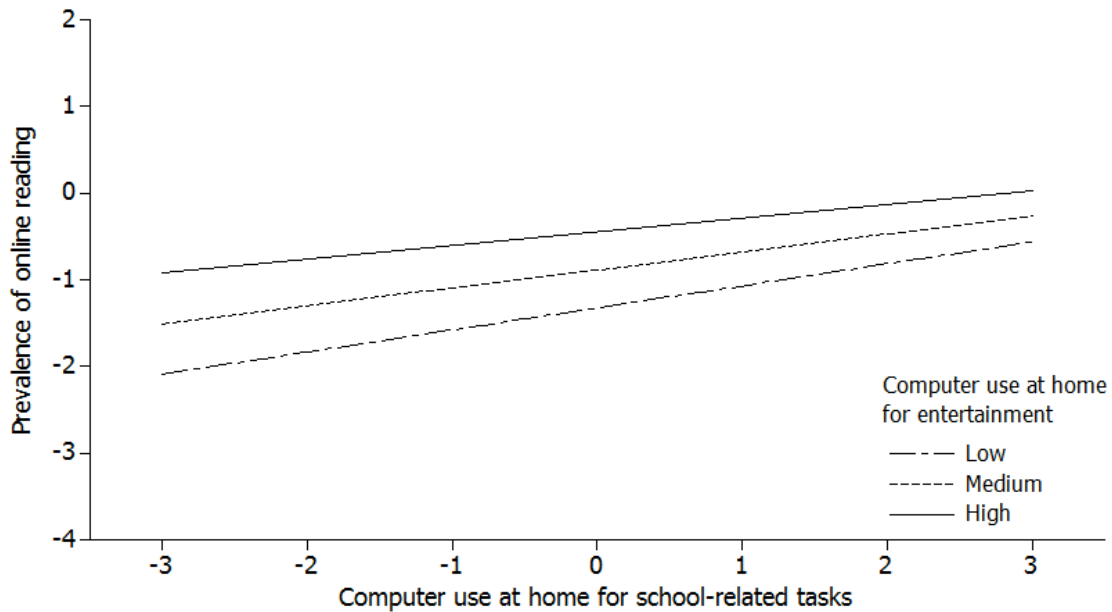
Figure 2: The moderating effect of computer use at home for entertainment on the relationship between computer use at home for school-related tasks and prevalence of online reading.

Figure 3 shows the effect of computer use at school on prevalence of online reading at three different levels of computer use for entertainment (Low, M - 1SD; Medium, M; High, M + 1SD) while holding all other variables constant at their average levels. The plot suggests that for

students whose computer use for entertainment is low there is no relationship between computer use at school and prevalence of online reading, while this relationship is positive for students whose computer use for entertainment is moderate and slightly negative for students whose computer use for entertainment is high. This is a remarkable result that is basically suggesting that a moderate amount of computer use at home for entertainment is actually a good thing that can have a beneficial moderating effect on the relationship between computer use at school and prevalence of online reading. One possible explanation for this observed phenomenon could be that students who spend too much time with computers for entertainment purposes (such as playing computer games) may find non-entertainment tasks less exciting and boring while on the other hand students who spend too little time with computers outside of school-work may not have well-developed computer skills necessary to realize their full potential, with either case resulting in a weak effect of computer use at school on prevalence of online reading. The overall implication here is that there are positive spillover effects of computer use at home for entertainment on prevalence of online reading but only when such computer use is moderate.
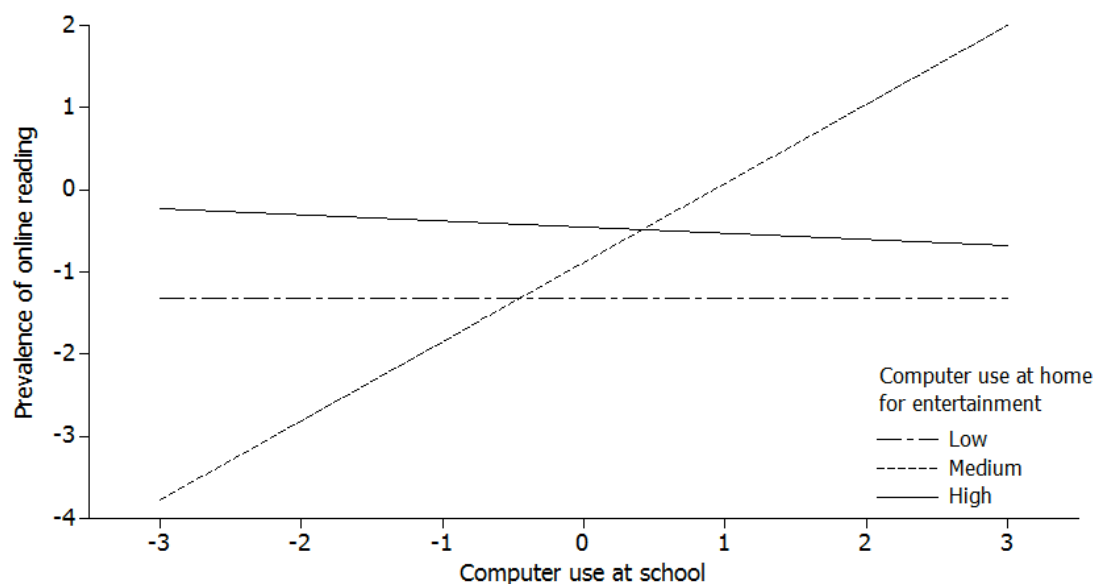
Figure 3: *The moderating effect of computer use at home for entertainment on the relationship between computer use at school and prevalence of online reading.*

Based on the discussion presented in this section our general conclusion is that computer use, whether at home or school and whether for entertainment- or school-related tasks, is a significant predictor of online reading even after accounting for demographic differences among students such as gender, grade, and socioeconomic status. Additionally, these various types of computer use moderate each other's effect on prevalence of online reading. Given the potential explanatory link between online reading and reading literacy as suggested by previous research, the findings reported in this study add to our understanding of the determinants of prevalence of online reading which in turn can contribute to the improvement of reading literacy among high school students.

It should be noted that the findings presented in this study generalize only to the population of 15-year old students in Qatar. Although this represents a good approximation to the high school student population in this country the results may not be applicable to other countries given the

often significant differences in social, political, and economic dimensions. We encourage those interested in this line of research to replicate our study with samples from other countries, age groups, and grade levels in order to gain a better understanding of the variation in prevalence of online reading. Our findings also suggest that any comprehensive theoretical or empirical model of online reading habits should not only include a mechanism to differentiate between school and home use of computers but also whether such use is for entertainment or school-relates tasks.

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