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AN ANALYSIS OF PISA DATA TO EXPLORE THE RELATIONSHIP BETWEEN STUDENTS' COMPUTER USE ATTITUDES TOWARD SCHOOL AND READING ENJOYMENT TIME

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Abstract

As use of technology continues its rapid growth among students, both within and outside of the educational context, its effect on students' performance and attitudes becomes an increasingly important question to address. If computers move from being supplements to being the core of the learning environment and students' daily life, this may constraint opportunities for social and intellectual development interfering with their reading and the learning activities. The purpose of this study is to compare the relationships that exist between students' computer and Internet use and students' reading enjoyment time and attitudes toward school for 15-year-old students in Türkiye, based on data from the Program for International Student Assessment (PISA) 2018. The sample includes 4996 students who participated in Internet use and school achievements questionnaires. By using SPSS, survey results are organized and the correlation matrix of the variables being used in the analyses is created. And then, to test the hypothesized model, AMOS 4.0 software is used. For testing that hypnotized model, the technique of SEM (Structural Equation Modeling) is used. The path model indicating the possible relationship is tested. The endogenous variables are (1) Reading enjoyment time and (2) Attitude toward school while the exogenous variables are (1) Computer use in classroom, (2) Internet use at school (out of class), (3) Internet use at home, (4) Internet use for entertainment, and (5) Index of economic, social, cultural status. With the runned path model analysis, the results of this study indicate that computer and Internet use in school are positively related with Internet use at home which seems to have a negative relationship with reading enjoyment time.

Keywords: computer use; attitude toward school; reading enjoyment

Legal Permissions: Since the data has not been collected from humans within the research, it is not subject to ethics committee approval.

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ÖĞRENCİLERİN BİLGİSAYAR KULLANIMI, OKULA KARŞI TUTUMLARI VE KİTAP OKUMAK İÇİN GEÇİRDİKLERİ ZAMAN ARASINDAKİ İLİŞKİ: PISA VERİLERİNİN ANALİZİ

Öz

Bilgisayar ve tabletlerin evlerde eğitim amaçlı kullanımının hızla artımasının öğrencilerin performansı ve tutumları üzerindeki etkisi, incelenmesi gereken çok önemli bir soru haline gelmekedir. Bilgisayarlar tamamlayıcı olmaktan, öğrenme ortamının ve öğrencilerin günlük yaşamının çekirdeği olmaya geçmesi durumu, öğrenme sürecine müdahale ederek, öğrencilerin sosyal ve entelektüel gelişim fırsatlarını ciddi bir ölçüde kısıtlayabilir. Evde eğitim amaçlı bilgisayar kullanımının bu derece büyümesinin olası sonuçları incelenmelidir. Bu çalışmanın amacı, Türkiye'deki 15 yaşındaki öğrencilerin bilgisayar ve internet kullanımı ile kitap okuma ile geçirdikleri keyifli zaman ve okula karşı tutumları arasındaki ilişkileri Uluslararası Öğrenci Değerlendirme Programı -PISA, 2018- verilerine dayanarak karşılaştırmaktır. Örneklem, internet kullanımı ve okul başarıları anketlerine katılan 4996 öğrenciyi kapsamaktadır. SPSS kullanılarak anket sonuçları düzenlenmiş ve analizlerde kullanılan değişkenlerin korelasyon matrisi oluşturulmuştur. Ardından, varsayılan modeli test etmek için AMOS 4.0 yazılımı kullanılmıştır. Bu hipotize edilmiş modeli test etmek için "Yapısal Eşitlik Modelleme" (YEM) tekniği kullanılmıştır. Öğrencilerin bilgisayar kullanımı ile okuma zamanı ve okula yönelik tutumları arasındaki ilişkiyi gösteren yol modeli test edilmiştir. Çalışmada içsel değişkenler (1) Okumadan keyif alma zamanı ve (2) Okula karşı tutumlar; dışsal değişkenler (1) Sınıfta bilgisayar kullanımı, (2) Okulda internet kullanımı (sınıf dışı), (3) Evde internet kullanımı, (4) İnternetin eğlence amaçlı kullanımı ve (5) Ekonomik, sosyal, kültürel durum endeksi olarak belirtilmiştir. Yol modeli analizine göre, evde bilgisayar kullanımı ile okula karşı tutum arasında ve evde bilgisayar kullanımı ile okuma keyfi süresi arasında negatif bir ilişki olduğu görünmektedir.

Anahtar Kelimeler: bilgisayar kullanımı; okula karşı tutum; okuma ile geçen süre

Yasal İzinler: Bu araştırma kapsamında insandan veri toplanmadığından etik kurul iznine tabi değildir.

Geniş Özet

Son yıllarda eğitimi geliştirmek için teknoloji entegrasyonu hem eğitimciler hem de öğrenciler için daha çekici hale gelmiştir (Abdullah, et.al., 2015; Jan, 2018). Teknoloji kullanımı, hem eğitimde hem de günlük yaşantıda öğrenciler arasında hızla yayılırken, bu yaygın kullanımın öğrenciler üzerindeki akademik ve sosyal etkisi, hızla ele alınması gereken önemli bir soru haline gelmektedir. Bilgisayarlar, öğrenme ortamının tamamlayıcısı olmaktan çıkıp, öğrencilerin günlük yaşamının merkezi olmaya başladığı noktada; öğrencilerin öğrenme süreçleri ve entelektüel gelişim fırsatları ciddi oranda kısıtlanabilir. Bilgisayarların hali hazırda hayatların içine bu kadar girmesinin yanısıra, Covid-19 pandemisi gibi beklenmedik durumlar, tüm yüz yüze eğitimi ve günlük hayatı tamamen kapatarak, benzeri görülmemiş zararlara neden olabilir. Bu tip krizlerle de çevrimiçi öğretme ve öğrenme, eğitimin kaçınılmaz bir parçası haline gelmekte ve eğitim teknolojileri ve uygulamaları gitgide daha da öne çıkan bir araştırma alanı olmaktadır.

Eğitim teknolojisinin popüler bir çalışma alanı haline gelmesinden bu yana, eğitimciler ve araştırmacılar eğitime yapılan teknoloji entegrasyonunun öğrencilerin eğitim ve sosyal yaşamındaki etkinliğine katkılarını net bir şekilde anlamaya çalışmaktadırlar. Bununla birlikte, öğrencilerin sosyo-ekonomik durumu, teknolojinin sınıfta kullanılma şekli, entegrasyon düzeyi, öğretmenlerin bilgi düzeyi ve onu kullanma motivasyonu gibi çok çeşitli faktörleri sorgulamak gerekmektedir. Bu nedenle, öğrencilere teknoloji sağlamanın başarıyı artırdığını iddia etmek için kesin kanıtlar bulmak kolay değildir. Eğitim teknolojileri araştırma alanında hali hazırda bu konular gündemdeyken, COVID-19 pandemisi bir anda eğitimde normal olarak kabul ettiğimiz her şeye meydan okumuştur ve yaşamı her alanda kesintiye uğratmıştır. Belirleyici ekonomik etkilerin yanı sıra bu kapanma, tüm eğitim sistemini de tehlikeye atmıştır. Herhangi bir akademik kaybı önlemek için okullar, kolejler ve üniversiteler dahil olmak üzere eğitim kurumlarının çoğunun ani bir içimde çevrimiçi uzaktan öğrenme yöntemine geçiş yapmıştır. Hiç bir hazırlık olmadan çocuklar evlerinde olan mevcut teknolojileri kullnarak okula devam etmeye çalışmışlardır. Pandeminin uzaması ile de bu durum okullar açılsa bile artık öğrencilerin yaşantılarının bir parçası haline gelmiştir. Ancak bilgisayarların çocukların günlük yaşamına ve okul yaşamına entegrasyonu Türkiye'de nispeten yeni bir tartışmadır ve bu bağlamda etkili olup olmayacağına karar vermek için yeterli araştırma bulunmamaktadır. Tarihsel olarak, öğrencinin akademik başarısı ile bilgisayarların eğlence ve video oyunları için kullanımı arasındaki ilişki, olumludan olumsuza, ya da tarafsıza çok sayıda perspektiften tanımlanmıştır. Bilgisayar kullanımı ile öğrencilerin okula karşı tutumları ve başarıları arasındaki ilişkiler, kültür, sınıf düzeyi, verilen görevler ve öğretmenlerin arka plan bilgisi gibi çok sayıda faktörden etkilenir (Loong & Herbert, 2012; Vekiri & Chronaki, 2008). Teknolojinin eğitime entegre edilmemesi günümüzde söz konusu olamaz fakat başarılı bir entegrasyon için, yerine getirilmesi gereken koşullar çok iyi araştırılmalıdır.

Bu çalışma, bu bağlamda kanıtlar sunabilmek için; Uluslararası Öğrenci Değerlendirme Programı 2018 (PISA) kapsamında herkesin erişimine açık olan, 15 yaşındaki Türk öğrencilerin verileri kullanılmıştır. Çalışma, öğrencilerin bilgisayar kullanımının; onların okuma alışkanlıkları ve okula karşı tutumları üzerinde etkilerinin bir modelini test etmeyi amaçlamaktadır. Litertürde, bazı çalışmalar okul başarısı ile bilgisayar kullanımı arasında bir ilişki olduğunu göstermiştir. Bazı araştırmacılara göre kontrolsüz artan bilgisayar kullanımı öğrencilerin öğrenmeleri üzerinde olumsuz etkiler yaratmaktadır (Anand 2007; Bugeja 2007; Grimes and

Warschauer 2008; Junco 2012; Kubey, Lavin and Barrows 2001; McCoy 2013; Sharif, Wills and Sargent 2010; Skolnik and Puzo 2008; Wood et al. 2012). Örneğin; Ravitz, Mergendoller ve Rush (2002) çalışmalarında, okulda bilgisayar kullanımı, evde bilgisayar kullanımı ve akademik başarı arasındaki ilişkileri araştırmıştır. Elde ettikleri bulgulara göre, okulda bilgisayar kullanımı ile öğrencilerin akademik başarıları arasında ters yönlü bir ilişki bulunmaktdır. Jacobsen ve Forste (2011) da çalışmalarında, tüm elektronik ortam türlerinin kullanımı ile öğrencilerin başarıları arasında ters yönlü bir ilişki bulmuşlardır. Chen ve Peng (2008)'in nicel araştırmalarına göre, yoğun internet kullanıcısı (haftada 34 saatten fazla) olarak kabul edilen öğrencilerin, internet yoğun kullanmayan öğrencilere göre daha düşük notlara ve daha düşük öğrenme doyumuna sahip olduklarını bulmuşlardır. Wentworth ve Middleton (2014) da, yoğun teknoloji kullanıcılarından oluşan bir örneklemle (günde ortalama beş saat bilgisayar kullanımı) yaptıkları çalışmada, haftalık bilgisayar kullanımına harcanan zaman miktarı ile ders çalışmaya ayrılan zaman miktarı arasında güçlü bir ters yönlü ilişki bulmuşlardır. Öte yandan, Lei ve Zhao (2007) yaptıkları çalışmada, evde bilgisayarda çok fazla zaman harcanmanın öğrenci başarısında düşüşe neden olabileceğini, ancak bilgisayarda günde üç saatten az zaman geçiren öğrencilerin ortalama not ortalamasının daha yüksek olduğunu belirtmektedir. Lei ve Zhao (2007), öğrencilerin evde bilgisayar kullanmaları gereken süre için günde üç saatin kritik bir argüman olduğunu öne sürmüşlerdir. Tüm bunlar düşünüldüğünde teknolojinin bilinçli entegrasyonu eğitimin gelişimi açısından oldukça önemlidir.

Tüm bunlara ek olarak, bazı araştırmacılar, bilgisayar kullanım etkinlikleri için kullanılan zamanın, okuma ve ders çalışma etkinlikleri için harcanan zamanın yerini alması ile öğrencilerin alışkanlıklarının değişmekte olduğu savunulmaktadır. Rosén ve Gustafsson'a (2014) göre bilgisayar kullanımının istenmeyen etkilerinin nedenini; okumaya harcanan zamanın ve ilginin azalmasından kaynaklandığını vurgulayan bir yer değiştirme teorisi ile açıklamışlardır. Öğrencilerin eğitim amaçlı bilgisayar kullanımının en güçlü olumsuz etkisi, okuma alışkanlıklarını değişmesi yani okumaya ayırdıkları zamanın azalması olmuştur (Rosén ve Gustafsson 2016). Literatür ayrıca bilgisayar kullanımının başarı üzerinde hangi sebeplerden dolayı etkileri olabildiğini açıklamak için çok sayıda argüman sunmaktadır. Subrahmanyam v.d. (2000) eğitim amaçlı bilgisayar kullanımının, bilgisayar ekranı karşısında geçirdikleri toplam süreyi artırdığını, okuma ve eğitim etkinliklerinin yerini bilgisayarda geçen zamanının aldığını, ve bu durumun çocuklarda farklı becerilerin gelişimini olumsuz etkilediğini iddia etmiştir. Diğer bazı araştırmacılara göre bilgisayar kullanımı birçok yönden öğrencilerin dikkatini dağıtmakta ve bu durum başarıyı olumsuz etkilemektedir (McCoy, 2013; Ophir, Nass ve Wagner, 2009; Wood v.d. 2012).

Öte yandan, tutum ve davranış arasındaki ilişki, onlarca yıldır eğitim ve psikoloji araştırmacılarını ilgilendirmektedir. Tutumlar, bireyin bilişsel nesnelere karşı seçici olarak düşünmesini, hissetmesini, algılamasını ve davranmasını etkileyen sosyal inanç yapıları olarak tanımlanır (Kerlinger 1984). Herhangi bir okul dersine (yani fen, matematik, tarih) yönelik tutum, okula yönelik tutumların altında yatan bir yapı olan daha yüksek düzeyde bir tutumsal faktör oluşturabilir (Germann, 1988; Wilkins ve Ma, 2003). Pek çok eğitim araştırması, okula karşı tutum ve başarının önemli ölçüde ilişkili olduğunu göstermiştir (örn. Ethington, 1991; Marsh ve Yeung, 1998; Schofield, 1982). Bazı öğrenciler okulu yaşam ve gelecekteki mutluluk için önemli olarak algılayabilir, ancak bazıları muhtemelen ebeveyn desteğinin olmaması, sosyal model eksikliği, zihinsel yetenek eksikliği veya başarı eksikliği gibi çeşitli nedenlerle böyle hissetmeyebilir (Abu-Hilal 2000). Bu nedenle bu çalışma için bilgisayar kullanımının zaman içerisinde dolaylı olarak okula yönelik tutumu etkilediği varsayılmıştır. Literatür

incelendiğinde, öğrencilerin akademik başarı ile bilgisayarların eğlence ve oyun amaçlı kullanımı arasındaki ilişkinin olumludan olumsuza çok sayıda perspektif ile tanımlandığı görülmektedir. Ancak çalışmalar görece küçük örneklemlere odaklanmıştır.

Bu çalışmanın amacı, yapısal eşitlik modellemesi (YEM) tekniği ile, Türkiye'deki 15 yaşındaki öğrencilerin bilgisayar ve internet kullanımı ile kitap okuma ile geçirdikleri keyifli zaman ve okula karşı tutumları arasındaki ilişkileri Uluslararası Öğrenci Değerlendirme Programı -PISA, 2018- verilerine dayanarak karşılaştırmaktır. Örneklem, internet kullanımı ve okul başarıları anketlerine katılan 4996 öğrenciyi kapsamaktadır. Veriler, internette herkese açık erişimde bulunan OECD PISA 2018 veritabanında alınmıştır (PISA 2018 Database). SPSS kullanılarak anket sonuçları düzenlenmiş ve analizlerde kullanılan değişkenlerin korelasyon matrisi oluşturulmuştur. Ardından, varsayılan modeli test etmek için AMOS 4.0 yazılımı kullanılmıştır. Bu hipotize edilmiş modeli test etmek için "Yapısal Eşitlik Modelleme" (YEM) tekniği kullanılmıştır. Öğrencilerin bilgisayar kullanımı ile okuma zamanı ve okula yönelik tutumları arasındaki ilişkiyi gösteren yol modeli test edilmiştir. Bu çalışmada şu içsel değişkenler (endogenous variables) kullanılmıştır: (1) Okuma zamanı: Öğrencilerin ne kadar kitap, gazete, çizgi roman, kurgu vb. okudukları; (2) Okula yönelik tutum: Öğrencilerin okula gitmeyi ve okulda olmayı sevip sevmemeleri. Bu çalışmada şu dışsal değişkenler (exogenous variables) kullanılmıştır: (1) Sınıfta bilgisayar kullanımı: Öğrencilerin fen, matematik ve dil derslerinde bilgisayarı kullandıkları toplam süre; (2) Okulda internet kullanımı (sınıf dışı): Öğrencilerin okulla ilgili amaçlar için okulda interneti sınıf dışında ne kadar kullandığı; (3) Evde İnternet kullanımı: Öğrencilerin evde İnternet kullandıkları toplam süre; (4) İnternetin eğlence amaçlı kullanımı: Öğrencilerin interneti kişisel web siteleri, müzik indirmek, arkadaşlarla sohbet etmek vb. için ne kadar kullandığı; (5) Ekonomik, sosyal, kültürel durum endeksi. Buna göre, bu çalışmanın ana araştırma soruları şunlardır:

(1) Öğrencilerin internet ve bilgisayar kullanımı ile okula yönelik tutumları arasında doğrusal bir nedensellik ilişkisi var mıdır?

(2) Öğrencilerin internet ve bilgisayar kullanımı ve okuma ile geçen zamanları arasında doğrusal bir nedensellik ilişkisi var mıdır?

Göreceli olarak farklı bir yaklaşımla YEM kullanarak bu çalışma, eğitimcilere ve araştırmacılara, okul çocuklarının bilgisayara sahip olmasının bazı olası olumlu veya olumsuz sonuçları olabileceğini anlamaları konusunda ışık tutacaktır. Değişkenler arasındaki olası doğrusal ilişkileri (olası nedensel model) belirtmek için bir korelasyon matrisi oluşturulmuştur. Model hipotezlenirken bu korelasyonlar dikkate alınır. Bazı çıkarımlar yapmak için korelasyon katsayıları kullanılır. Örneğin, korelasyon matrisine göre, okulda internet kullanımı evde internet kullanımı ile ve evde internet kullanımı eğlence amaçlı internet kullanımı ile yüksek oranda ilişkilidir. Bu, çocukların bilgisayarlarını evde okuldan çok ve eğlence amaçlı kullandıkları anlamına gelmektedir. Bu nedenle internetin eğlence amaçlı kullanımının öğrencilerin okuma alışkanlıklarını ve okula yönelik tutumlarını olumsuz etkileyeceği varsayılmaktadır. Aslında, internetin eğlence amaçlı kullanımı, okuma süresi ve okula karşı tutumlarını olumsuz etkilediği varsayılmaktadır. Bu varsayımlara dayanarak, bir başlangıç hipotezi modeli oluşturulmuştur. En iyi model uyumunu bulmak için AMOS'ta yinelenen bir maksimum olabilirlik analizi yapılmıştır. AMOS'ta sunulan modifikasyon indekslerine göre, modelin verilere uyumunu iyileştirmek için olası modifikasyonlar modele uygulanmıştır. Bu çalışmada en iyi uyumu bulma kriterleri, Ki-karenin ($\chi 2$) serbestlik derecesine (df), GFI ve RMSEA oranıdır. $\chi 2$'nin df'ye oranı birkaç uyum indeksinden biridir ve modelimizin verilerimize uyduğunu söyleyebilmek için bu oranın 2'den küçük olması gerekmektedir (Schreiber, v.d.,

2006). Ayrıca GFI ve CFI değerleri 0.9'un üzerinde ve RMSEA değeri 0.05'ten küçük olduğu durum, kabul edilebilir bir uyumu göstermektedir (Hu ve Bentler, 1999; Kline, 2011).

AMOS'un model test edildiğinde oluşturduğu modifikasyon indekslerinin rehberliği yoluyla, birkaç yineleme uygulanır ve model, 2'den küçük χ2/df değeri veren en iyi model uyumunu elde etmek için değiştirilir; 0,9'dan büyük CFI ve GFI değeri; ve RMSEA değerileri ise 0.05'ten küçüktür. Model için ki χ2 değeri serbestlik derecesi (df) 2 ile 1.54'tür. Bu, 0.77'lik χ2/df değeri ile sonuçlanmıştır; bu, hipnotize edilmiş modelin AMOS tarafından oluşturulan yol modeline iyi uyduğu anlamına gelir. Ayrıca GFI değerinin 1.00, CFI değerinin 0.93 ve RMSEA değerinin 0.048 olarak bulunması modelin iyi uyum yakalamış olduğunu göstermektedir.

Yol modeli sonuçlarına göre, evde internet kullanımı ile bilgisayarın eğlence amaçlı kullanım arasında güçlü bir ilişki vardır ve de okumadan keyif alma süresi ile negatif bir ilişki vardır. Ayrıca yol modeline göre, okumadan keyif alma süresi okula yönelik tutum ile pozitif ilişkiliyken, evde internet kullanımı öğrencilerin okula yönelik tutumları ile negatif bir ilişkiye sahiptir.

Tartışıldığı gibi, bilgisayara sürekli erişimin, eğitimde etkililiği arttırdığını tartışmak için mevcut hiçbir kanıt ve destekleyici veri yoktur. Öğrenme süreci sosyal undurları da içermelidir. Öğrenciler sadece bilgiyi işledikleri için değil, aynı zamanda okul ortamında sosyalleştikleri için de öğrenirler. Bilgisayarlar, sıradan bir tamamlayıcı olmaktan çıkıp öğrenme ortamının ve sosyal yaşamının çekirdeği haline geldikçe, öğrencilerin okul performanslarını doğrudan veya dolaylı olarak etkileyebilirler. Bu çalışmada hipnotize edildiği ve seçilen örneklem için YEM yol modeli analizinden anlaşıldığı üzere, İnternet ve bilgisayar kullanımının okumaya yönelik tutumlar ve okula yönelik tutumlar ile olumsuz bir ilişkisi vardır. Birlikte ele alındığında, bulgular, bilgisayarların mükemmel araçlar olmasına ve bazı yönlerden eğitime entegre edilmesi gerektiğine rağmen, en önemli şeyin içeriğin, öğrenci profilinin ve olası yapıcı ve yapıbozucu sonuçların farkında olmak olduğunu göstermektedir (Göksu ve Bolat, 2020).

Öte yandan, bilgisayarlar velilerin, eğitimcilerin ve araştırmacıların rehberliğinde başarılı bir şekilde eğitime entegre edilebilirse, öğrencilerin yeteneklerini geliştirebileceğini de bilmek oldukça önemlidir (Kurt, v.d., 2021). Bunun için, bilgisayar kullanımı eğlence için bir araç olmak yerine, öğrencilerin temel sorgulama süreçlerini desteklemeli ve öğrenmeyi genişletmelidir (Oehlkers ve DiDonato, 2012).

Bu çalışmanın sonuçları, eğitimcilerin, velilerin ve yöneticilerin bilgisayar kullanımının öğrencilere günlük ve okul yaşamına entegre edilmesinin bazı beklenmedik olumsuz etkileri olabileceğini anlamaları konusunda eğitim alanı için önemli bir etkiye sahip görülmektedir. Bu tür çalışmaların yapılması önemlidir çünkü yeni bir yöntemin veya uygulamanın öğrencilerin öğrenmeleri üzerindeki olası olumsuz etkileri her zaman göz önünde bulundurulmalıdır. Günümüzde teknoloji her yerde mevcuttur ve teknolojinin eğitime entegrasyonu kaçınılmazdır ancak teknolojinin bu yaygınlığı eğitimcileri kör etmemelidir.

Introduction

In an era characterized by swift technological advances, our society is becoming increasingly more dependent on information and communication technologies (ICT), and particularly on computers and tablets. Thus, the effective use of computers becomes a critical

requirement due to its role as a tool for human advancement and spesifically teaching and learning. Hence, that effective utilization of computers across the student population is the ultimate goal of computer implementation in education. As use of technology continues its rapid growth among students, both within and outside of the educational context, its effect on students' performance and attitudes becomes an increasingly important question to address. If computers move from being supplements to being the core of the learning environment and students' daily life, this may constraint opportunities for social and intellectual development interfering with the learning process. Besides, unexpected situations like Covid-19 Pandemic have caused unprecedented damages by putting lives into a complete shutdown endangering the entire education system. This crisis caused a swift shift to online learning which was inevitably prolonged and online teaching and learning have become an inevitable part of education. Hence, computer use and internet use of students become a part of their daily life that may they may constraint opportunities for interfering with their reading and the learning activities.

Worldwide economic competitiveness has increased swiftly, consequently educational improvement is a foremost concern in many countries around the world. Especially in developing countries, improving educational standards are seen to be tough and challenging because of insufficient educational resources. Thus, in recent years, educational technology has become a basis to enhance education and makes it more attractive for both educators and students (Abdullah, et.al., 2015; Jan, 2018). Recent technological applications and tools are integrated to improve the performance of teachers and students. The impact of educational technologies on today's classrooms and students cannot be disregarded that huge amount of money and effort is invested in educational technologies whole around the world. Governments dedicates big portion of their budgets to make schools equipped with computers. Educators and researchers have been trying to clearly understand effectiveness of computer integration to students' educational and social life since educational technology became a popular field of study. However, effectiveness of computer integration to schools can be questionable in some cases because there are various factors that may affect the impact of technology such as socio-economic status of the students, the way technology is used in classroom, the level of integration and the level of teachers' knowledge and motivation to use it. Schacter (2001) stated, "The level of effectiveness of educational technology is influenced by the specific students' population, the software design, the educator's role, and the level of students' excess to technology" (p. 5). Furthermore, there are plenty of tools and methods within educational technology and pervasiveness of computer use out of school is also explicit. Hence, it is not easy to find clear-cut evidences to claim that providing students technology improves achievement. While integrating technologies, in today's competitive educational climate, considerable attention should be focused on students' academic achievement and the school environment which are necessary to develop. An up-to-date technological set-up is generally considered a key part of an effective school setting but there are not precise evidences to prove this. While these issues were in the agenda, suddenly the COVID-19 pandemic has challenged and disrupted everything that we normally take for granted in education causing unprecedented damages by putting lives into a complete shutdown. Besides the determinate economic impacts, this shut down has also jeopardized the entire education system. To avoid any academic loss, most of the educational institutes including schools, colleges and universities are found to get shifted to online mode of learning. Studying the effectiveness of learning environments and learning tools in the

context of online learning is critical cause these are two of five critical components of online learning (Gürcan & Özyurt, 2020).

Besides these factors, technology has been developed fast and while the effectiveness of computers was still in the agenda, mobile learning tools like smart phones, tablets and computers have become ubiquitous in every part of life (Göksu & Bolat, 2020). Subsequently, new educational applications and digital books are developed very quickly and their integration into education and children's daily life came into agenda. However, integration of computers in children's daily life and school life is a relatively new dispute in Türkiye and there is not sufficient research to decide if it will be effective or not in that context. The relationships between computer usage and students' attitudes toward school and their achievement are affected by numerous factors, such as culture, grade level, given tasks, and teachers' background knowledge (Loong & Herbert, 2012; Vekiri & Chronaki, 2008). Srite, et.al. (2008) suggest that cultural values influence technology acceptance and use. Therefore, giving each child a tablet or computer can have positive impacts on their school performances. However, on the other hand, having tablets or computers on their elbow all the time may negatively affect their school performances by changing students' reading and studying habits.

Increasing computer access at home has been observed since the beginning of 1990s. According to researches, higher and higher numbers of children claimed that they use computers at home every day and for many hours. This shows a collective change in spare time habits, and researchers across disciplines pose questions about their effects (Fraillon et al. 2014; Hussain, 2007; OECD 2015). Cognitive theories of education propose that learning is a combination of cognitive and social elements. Therefore, as computers become a part of social life and limit their social interactions with their environment, learning process can be interfered (Weglinsky 1998). According to Kulik's (1994) research through meta-analysis of more than 500 studies of computer-based instruction, computer-based instruction results in students' higher achievement scores; nonetheless, computers did not have positive effects on every area. Therefore, there may be some undesirable effects when students are given computers regardless of existing specific student population, software design, educator's roles, the level of students' excess to technology and their socioeconomic status.

These conflicting results point to a need for a better understanding if there is a relationship between computer use, attitudes toward school and students' spent time for reading. Therefore, to be able to find some evidences; in this study, Turkish Students' data from recent Program for International Student Assessment (PISA) is used. The study tests a model of these students' computer use and Internet use might have impacts on their reading enjoyments and attitudes toward school.

Related Literature and Background

The innate assumption underlying increased computer integration in classroom is the belief that increased access will successfully enrich students' learning outcomes; though, research on the effect student use of technology has on educational outcomes is inconclusive yet. Studies have indicated that there is a correlation between school achievement and computer use at home and school.

On one hand, several researchers have defined the positive impact computer use has on learning outcomes, (i.e., Holcomb 2009; James & Lamb, 2000; Ophir Nass and Wagner,

2009; Rosenqvist e.al. 2016; Sivin-Kachala, 1998). Fiorini (2010) conducted longitudinal research in Australia and collected data from 4–5 years old children. According to the results, home computer use has positive effects on two different cognitive tests measuring school readiness. Weglinsky (1998), found that home computer use was positively related to academic achievement, while an emphasis on in-school use was negatively related to academic achievement. According to a longitudinal data conducted from 2000 to 2005 with fifth and eighth grade students (Vigdor Ladd and Martinez 2014), students' computer access expanded prominently, as did the convenience of home high-speed internet access during this time period. Vigdor, Ladd and Martinez (2014) concluded that having access to a computer at home have statistically significant negative effect on students' mathematics and reading test scores. Rosenqvist et. el. (2016) studied the correlation between time spent watching TV, using the computer, or reading and performance on neurocognitive functions (i.e., attention, learning, memory) in 5–12-year-old children. According to their findings, there was a positive correlation between computer use and neurocognitive functions while a negative correlation between TV watching and neurocognitive functions. Wittwer and Senkbeil (2008) propose that students who use a home computer almost every day get higher score in mathematics compared to those who use the computer less than once a month. Despide those studies and their results, most of these studies emphasize that for computers to have an effect on achievement, their use must be challenging, focused on higher order thinking skills, the teachers must be capable of using and teaching with computers and have the appropriate support. In other words, examining computer use or technology by itself is not enough to determine its effects on student achievement because the computers are ubiquitously in our lives but not always spesifically designed and integrated as in those studies.

On the other hand, according to some researchers increased computer use has negative effects on students' learning (Anand 2007; Bugeja 2007; Grimes and Warschauer 2008; Junco 2012; Kubey, Lavin and Barrows 2001; McCoy 2013; Sharif, Wills and Sargent 2010; Skolnik and Puzo 2008; Wood et al. 2012). In one of the most comprehensive studies to date in this realm, Wittwer and Senkbeil (2008) scrutinized the PISA 2003 data sample of 4,660 15-year-old German students, in which they assumed to be a model of student engagement with computers and videogames that exhibited the difference between the relationship of computer use and video gaming for fun on academic achievement. First, Wittwer and Senkbeil (2008) inspected the relationship between having a computer in the home, frequency of computer uses and mathematics achievement, presenting a positive significant relationship. However, when they controlled for multiple covariates of achievement, these wide measures of computer access and use were no longer significantly related to achievement. Though, they then conducted a latent class analysis to examine a way of student computer use, finding multiple types of computer users like computer use at home for fun. The authors confirmed a significant positive relationship between achievement and students who acquired their computer skills on their own for social and entertainment purposes. This was in comparison to students who used computers mainly for school and communicating online, for gaming, or for neither, each of which were not related to student achievement. In another study, Ravitz, Mergendoller, and Rush (2002) explored the relationships between student computer use at school, computer use at home, and academic achievement. They also wanted to inspect whether results vary by the amount of computer use in school or at home. According to their findings, using percentage of students as a measure, there is a negative relationship between computer use at school and students' academic achievement. On the other hand, students who score better on standardized achievement tests are those who use computers more often

at home, and less at school. Jacobsen and Forste (2011) found a negative correlation between using all types of electronic media and grades. According to their quantitative study, Chen and Peng (2008) found that students considered to be heavy internet users (more than 34 h per week) had lower grades and lower learning satisfaction than non-heavy users. In their study with a sample of high frequency technology users (on average five hours a day of computer use), Wentworth and Middleton (2014) found a strong negative relationship between the amount of time spent on computer use per week and the amount of time spent studying. As a result, students who spent more time on computer use, compared to those who spent less time, had lower GPAs. In their study, Lei and Zhao (2007) indicate that too much time spent on a computer a home can cause a decline in student achievement but students who spent less than three hours daily on the computer had a higher mean grade average. Lei and Zhao (2007) proposed three hours a day to be a critical argument for the span of time students should use computers at home. Another study conducted by the Educational Testing Service (ETS) stated that students who spent less time on computers in school essentially performed better than those who spent more time on them (cited in, Wenglinsky, 1998). The results of this study proposed that technology can assist academic achievement, depending on how it is used. Additionally, the Third International Mathematics and Science Study (TIMSS) reported that computer use in the classroom was negatively correlated with high student achievement in a number of countries where the students from these countries implying that they used computers in the classroom most frequently were those with the lowest achievement on the TIMSS in 1995 (Papanastasiou, 2002).

While many researches indicated that there is a negative or positive correlation between computer use and achievement, some researchers found that there is no correlation (Fairlie and Robinson 2013; Göksu & Bolat, 2020; Skoric, Teo, and Neo 2009; Wittwer and Senkbeil 2008). Mumtaz (2001) wanted to examine the nature and experiences of children's computer use in the home and school and wanted to find out how children perceive and enjoy computer use in these two environments. According to the results, the most popular activity on the home computer which all children enjoyed was playing games and the activities at the school computer considered boring.

In addition to content, some other researchers argue that transposition of time spent for computer use activities and reading activities will have an impact on students' habits. In 1995, Neuman observed that the amount of TV-watching negatively affected achievement may be because of displacement of out-of-school reading activities and school work. According to Rosén and Gustafsson (2014), the undesirable effects of computer use can be explained through a displacement theory emphasizing that the negative effects of computers to be because of a lessening amount of time and interest being spent on reading. The strongest negative effect of computer use would be found on reading a continuous text which needs extensive practice of reading and time for sure (Rosén and Gustafsson 2016).

The literature also provides numerous arguments and hypotheses to describe why there may be an outcome of computer use on achievement. Subrahmanyam et al. (2000) claimed that access to computers increases the total amount of time children spend in front of a computer screen instead of other activities computer time replaces reading and educational activities, having negative effects on the development of skills. In a study (Wentworth and Middleton, 2014) scrutinizing technology use and its effects on school performance, it is found that there was a strong negative relationship between the amount of time spent on computers per week and the amount of time spent studying. Thus, those who spent more

time on their computer, compared to those who spent less time, had lower grades and spent less time studying. The reverse was also true. According to some other researchers, computer use distracts the students' attention in many ways and this has a negative effect on achievement (McCoy 2013; Ophir, Nass, and Wagner 2009; Wood et al. 2012). In addition, some researches indicated that even if the student is not using computer, other students' computer use in class can distract the students' attention (Fried 2008; Junco 2012; Sana 2012). In 2004, Fuchs and Wößmann analyzed 2000 PISA data from 31 countries taking student home background, differences in school resources and other institutional factors into consideration. According to the results of this research, there was a strong negative correlation between computer use at home and achievement because computers at home distracts students from effective learning. In a qualitative study, Chou (2001) reported sleep deprivation due to heavy internet use which, in turn, was correlated with poor academic performance. In addition, some other researches tried to discover the effects of using computers or tablets while involved in school work to determine whether the negative effect of computer use on achievement is because of multitasking. Most of these studies indicate that effective multitasking is impossible because our brains are not intended to simultaneously join to multiple incoming information sources efficiently (Marois and Ivanoff 2005; Monsel 2003; Ophir, Nass and Wagner 2009.). In a study (Ayieko, et.al., 2017) highlighting the relationships between the extent to which computers are used for learning mathematics and students' mathematics reasoning across different contexts; it is reported that computer use was negatively related to students' reasoning suggests that spending extended time on computers out of school delays the development of problem-solving skills. Moreover, the regularity of specific activities influences learning outcomes that students need for problem solving in today's technologically advanced society.

The relationship between attitude and behavior has been of concern to researchers in education and psychology for decades. Attitudes are defined as ongoing and organized constructions of social beliefs that influence individual to think, feel, perceive and behave selectively toward cognitive objects (Kerlinger 1984). Attitude toward any school subject (i.e. science, math, history) may form a higher-order attitudinal factor which is an underlying construct of attitudes towards school (Germann 1988; Wilkins and Ma 2003). In a study aiming to test the structure of attitudes to school subjects and to test the causal relationship between attitudes, goal and achievement with SEM procedures, Items measuring attitude towards each subject matter clustered around one factor indicating that each school subject is unique, but related, to other subjects. These related factors seemed to be underlined by a higher-order construct which is attitudes toward school that influence achievement (Abu-Hilal 2000). Many educational researches indicated that attitude toward school and achievement are significantly correlated (e.g., Ethington 1991; Marsh and Yeung 1998; Schofield 1982). Some students may perceive school as important for life and future happiness, but some may not feel like that probably because of various reasons like lack of parental reinforcement, lack of social model, lack of mental abilities or lack of achievement (Abu-Hilal 2000). Therefore, for this study it is assumed that computer use may have been affecting attitude towards school indirectly in the course of time.

Framework of the present study

Given the related literature, toward a broader framework for studying computer and technology use at home and at school and learning outcomes and attitudes, there is sufficient reason to believe that uses of computers that actually improve student learning may vary and

it depends on a number of factors. Accordingly, the research in this realm of the relationship of computer use and student academic achievement and attitudes toward school presents a set of contradictory studies and effects. When the literature is reviewed, it is seen that the relationship between student academic achievement and use of computers for fun and video gaming has been described from a multitude of perspectives, from positive, to negative, to null effects because various dependents and reasons. Yet these studies have focused on small intact and small samples. The purpose of the present study is to examine the association between academic achievement. Thus, overall, the research to date indicates that not only do students use computers in different ways, but that these different uses relate to academic achievement differently. However, the majority of the findings to date have depended on small non-random samples, or contexts outside of Türkiye, and have not consistently controlled for the multiple known covariates of student achievement.

These inconsistent results all over the literature may be because of the fact that those researches are conducted with a wide range of age group in different countries, different kinds of computer use activities, and different types of achievement. Much of the previous literature shows the limited evidence indicating the computer use and being online out of school environment (at home) may affect students' reading habits and attitude toward school. By using the technique of structural equation modeling (SEM), this study tried to understand the effect of Turkish students' computer use at home to their reading enjoyment times and attitudes toward school that is basically if students like going to school or being at school or not. As such, the main research questions for this study are:

(1) Is there any linear causal relationship between internet and computer use of students and their attitudes toward school?

(2) Is there any Is there any linear causal relationship between internet and computer use of students and their reading enjoyment time?

With a relatively different approach, by using SEM, this work will shed light to educators and researchers to realize that there may be some possible positive or negative consequences of computer possession of school children. Therefore, it is significant to understand potential effects of equipping students with computers considering characteristics of targeted student population so that projected learning objectives can be achieved.

Method

The Data

The data is retrieved from the OECD PISA Database 2018 Web site (PISA 2018 Database, 2018) where all the PISA data is presented as an opensourse data available for everyone throughout the world. The purpose of the PISA was to assess the cumulative educational experiences of students who were 15 years of age at the time of the assessment, regardless of the grade levels or type of institutions in which they were enrolled. For the purpose of the present study, the data from Türkiye is examined. The sample was selected as a representative of a low-achieving country on PISA, but whose students tend to use computers quite frequently in a variety of settings.

Türkiye sample consist of 4996 15 years old students who participated in Internet use and school achievements questionnaires. By using SPSS, survey results are organized and the correlation matrix of the variables being used in the analyses is created. And then, to test the hypothesized model, AMOS 4.0, a structural equation modeling (SEM) software is used.

Structural Equation Modeling (SEM)

SEM is a technique of path analysis that supports causality in non-experimental designs but not a technique for making interpretations of casual effects (Kline 2011). SEM allows researchers to create a structural path model estimating hypothesized paths between exogenous (independent) and endogenous (dependent) variables that are basically predictor and outcome variables. The application of the SEM method starts with the description of a model to be estimated. Therefore, the assessment of goodness of fit and the estimation of parameters of the hypothesized model(s) are the primary goals. According to Hu and Bentler (1999), the two most popular ways of evaluating model fit are those that involve the Chi-square (χ2) goodness- of-fit statistics and fit indexes. Some of the important fit indexes to be reported include Goodness-of-Fit Index (GFI), comparative fit index (CFI), and the root mean square error of approximation (RMSEA) (Hu and Bentler 1999).

Models with more parameters necessitate more estimates, so larger samples are necessary in order for the results to be rationally stable. According to Kline (2011), A “typical” sample size in studies where SEM is used is about 200 cases. Therefore, for this study SEM is an appropriate technique that the sample size is 4996.

For this study, to be able to make some interpretations related to the correlations between Internet/computer use and students reading enjoyment times and attitudes toward school, the following variables are selected.

Endogenous Variables

Endogenous variables are used in linear regression. They are similar to (but not exactly the same as) dependent variables. Endogenous variables have values that are determined by other variables in the analysis (these “other” variables are called exogenous variables) (Kline 2011). The following endogenous variables are used in this study. (1) Reading enjoyment time: How much students read books, newspapers, comics, fictions etc.; (2) Attitude toward school: If students do like or do not like going to school and being at school.

Exogenous Variables

An exogenous variable is a variable that is not affected by other variables (Kline 2011). The following exogenous variables are used in this study. (1) Computer use in classroom: Total time that students use computer in science, math, and language classes; (2) Internet use at school (out of class): How much students use Internet out of class at school for school related purposes; (3) Internet use at home: Total time students use Internet at home; (4) Internet use for entertainment: How much students use Internet for personal web sites, downloading music, chatting with friends etc.; (5) Index of economic, social, cultural status.

Hypothesized Model

In the behavioral sciences, casual modeling is rarely specified. A causal model when proposed is usually hypothesized and then tested by using the sample data. Specifically, when the true causal model is unknown but the hypothesized model fits the data, about all that can be said is that model is consistent with the data, but the model is not proven (Streiner 2006). At this point, SEM can be seen as a discomfirmatory method, one that can aid us to reject false models (those with poor fit to the data) (Kline 2011).

To indicate the possible linear relationships (possible casual model) between the variables, a correlation matrix is created (Table 1). While hypothesizing the model these correlations are taken into consideration. To make some inferences, the correlation coefficients are used. For example, according to the correlation matrix, Internet use at school is correlated with Internet use at home and Internet use at home is highly correlated with Internet use for entertainment. This means children are using their computer at home more for entertainment rather than for school purposes.

Table 1. Correlation Matrix

	Int. use at school	Int. use at home	Compt. use in class	Int. use for entert.	Index of e-s-c status	Attitude toward school	Reading enjoyment time
Int. use at school	1	.283**	.404**	.192**	-.067**	.057**	.-041**
Int. use at home	.283**	1	-.257**	.921**	.399**	-.075**	-.150**
Compt. use in class	.404**	-.257**	1	.191**	.049**	.017	.005
Int. use for entert.	.192**	.921**	.191**	1	.419**	-.117**	-.198**
Index of e-s-c status	-.067**	.399**	.049**	.419**	1	-.130**	.014
Attitude toward school	.057**	-.075**	.017	-.117**	-.130**	1	.227**
Reading enjoyment time	.-041**	-.150**	.005	-.198**	.014	.227**	1

Therefore, it is assumed that Internet use for entertainment may negatively affect students' reading enjoyment times and their attitudes toward school. In fact, Internet use for entertainment is negatively correlated with reading time and attitude toward school. Beside

those, it is also assumed that students' socio-economic statuses are correlated with their Internet possessions so the time they use it at home. These assumptions can be made based on the logical and empirical order in which they occur over time. An initial hypothesized model based on these assumptions is created as indicated in Figure 1. An iterated maximum likelihood analysis is conducted in AMOS to find the best model fit. According to the modification indices presented in AMOS, the possible modifications are applied to the model to improve the fit of the model to the data. In this study, the criterion to find the best fit is the ratio of Chi-square (χ2) to degrees of freedom (df), GFI, and RMSEA. The ratio of χ2 to df is one of the several fit indexes and to be able to say our model fits to our data, this ratio should be smaller than 2 (Schreiber, et.al, 2006). In addition, the GFI and CFI values over 0.9, and the RMSEA value smaller than 0.05. indicate an acceptable fit (Hu and Bentler 1999; Kline 2011).

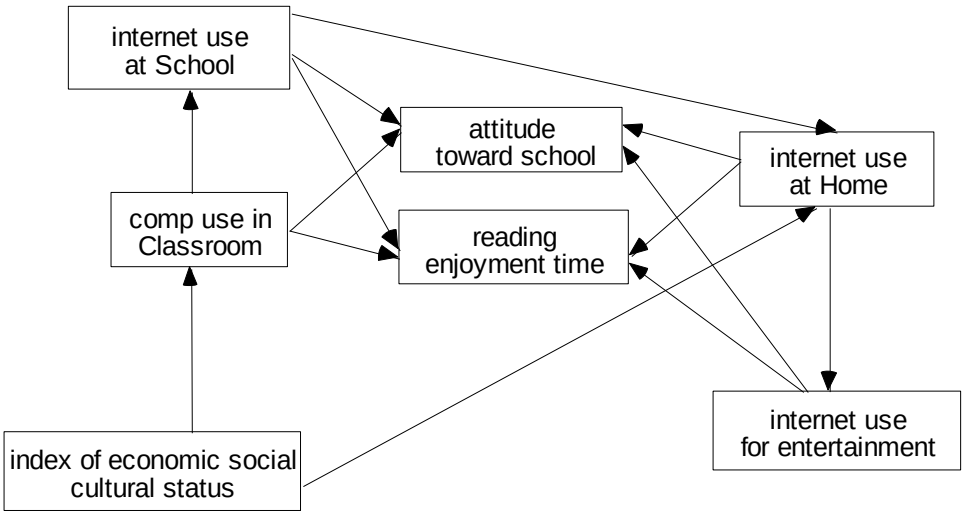

Figure 1. Hypothesized Model

Analyses and Results

Relationship that been hypothesized by the model is tested through AMOS. It is hypothesized that computer use at school may affect students' computer use at home as well, and therefore may affect students' reading enjoyment times and attitudes toward school at a point in time. Figure 2 indicates the path model analysis including standardized path coefficients. Through guidance of modification indices that AMOS generates when the model is tested, a couple of iterations are applied and the model is altered to get the best model fit that gives χ2/df value smaller than 2; CFI and GFI value larger than 0.9; and RMSEA value smaller than 0.05.

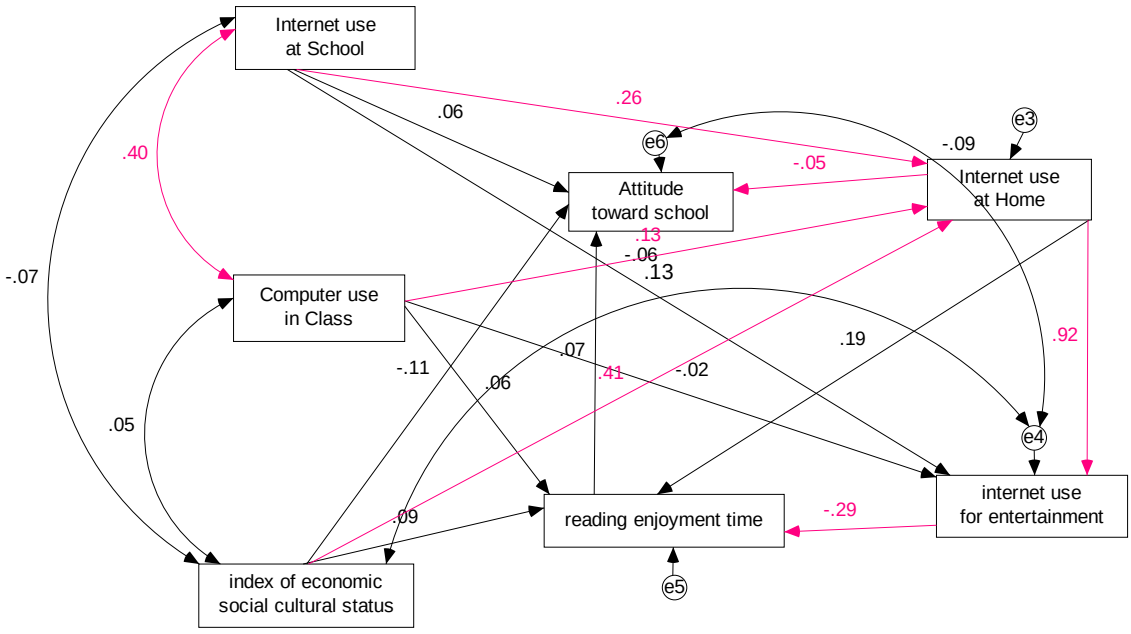

Figure 2. Path Model Analysis

Chi square (χ2) value for the model is 1.54 with a degree of freedom (df) 2. This resulted in the χ2/df value of 0.77, which means that the hypnotized model fits well with the path model created by AMOS. In addition, GFI value is 1.00, CFI value is 0.93 and RMSEA value is found to be 0.048 indicating that the model is a good fit.

According to the path model results indicated in Figure 1, computer and Internet use in school are positively related with Internet use at home. There is a strong relation between Internet use at home and using it for entertainment that seems to have a negative relationship with reading enjoyment time. In addition, according to the path model, reading enjoyment time is positively related with attitude toward school while Internet use at home has a negative relationship with students' attitudes toward school.

Discussion and Conclusion

Two hypotheses regarding the the effect of home computer use on students' reading enjoyment and attitudes toward school were proposed. First, the hypothesized model created by the initial assumptions indicated that there should be some modifications through the light of modification indices that AMOS software proposes. Second, with the required modification, the best model is created that indicate computer use at home has a strong negative relationship between reading enjoyment and attitude towards school. As declared, educational technology is currently experiencing substantial growth, and transformation of education with the existing technologies that comprise it is inevitable. Besides, students have the opportunity of having personal computers and even tablets in their social lives. In Türkiye, the pervasiveness of computer uses both at school and at home is a relatively recent situation and as government works on the projects like the one support 16 million students with tablets and computers, various students coming from different backgrounds and socio-economic status ensured the opportunity of having personal tablets or computers. However, as

discussed, there is no evidence and supporting data available to argue the effectiveness of having access to computer. As mentioned in the introduction part, learning may include social elements. Students learn not only because they process information, but also because of the socialization. As computers move from being ordinary supplements to being the core of the learning environment and their social life, it directly or indirectly affects students' school performances. As hypnotized in this study and as realized from the SEM path model analysis –for the selected sample-, Internet and computer use have a negative relationship with reading attitudes and attitudes toward school. Taken together, findings indicate that even though computers are perfect tools and should be integrated in education in some ways, the most important thing is being aware of the content, the student profile along with the possible constructive and deconstructive consequences. Possibly computers had a damaging effect on students' social, emotional, and physical development (Alliance for Childhood 2004; Healy 1999). According to Abu-Hilal (2000), Therefore, the social and psychological impacts of daily activities on students' achievement are more striking than the impacts of tests and exams.

On the other hand, it is significant to know that if tablets and computers can be integrated successfully through the guidance of parents, educators and researchers, it may enhance students' capabilities (Kurt, v.d., 2021). Instead of becoming a tool for fun, technology should support students' fundamental inquiry processes and extend learning (Oehlkers and DiDonato 2012). The quality of computer work was more important than the quantity. Rather than using computers for fun and routine tasks, using computers to help students work through complex problems will develop students' higher-order thinking skills (Wenglinsky 2005). Indeed, assessing the impact of educational technology or its relation to learning outcomes requires an understanding of how it is used in the classroom or at home, what learning goals are held by the educators or parents involved, knowledge about the type of assessments that are used to evaluate improvements in student achievement, and an awareness of the complex nature of learning for different individuals (Ravitz et. al., 2002).

In the light of related literature and inferences of the present study; the conclusions that can be reached about the interrelationship of computer use, learning outcome and attitudes toward school are restricted by the research methods that are used in pointed studies, as well as by the type of statistical analyses performed on the data of those studies. Subsequently, although some of prior studies have found positive correlations between computer use in the school and achievement (e.g., Holcomb 2009; James & Lamb, 2000; Ophir Nass and Wagner, 2009; Rosenqvist e.al. 2016; Sivin-Kachala, 1998; Vigdor, Ladd & Martinez, 2014), those correlations did not necessarily entail cause–effect relationships. On the same basis, non-experimental studies that found negative relationships between computer use and learning outcomes or attitudes toward school did not imply that computer use declines student achievement, or the other way around (Papanastasiou, 2002, 2003; Ravitz, Mergendoller, & Rush, 2002).

Considering the findings of the present study and other research in the literature that supports related assertions, it must be emphasized that it is not computer use itself that has shared dissent with the student's attitudes toward school or their reading enjotment time, but how and for what purposes computers are used by students at home or at school. Computers in education should not be studied in isolation nor as ''mere tools'', but within the context and structure of country, school, degree programmes and settings etc. in order to inspect how the interaction of technology, instructional methods, subject matter, and other contextual factors provide the circumstances required to support learning (Vrasidas & Glass,

2002). Furthermore, in order for technology integration to support effective learning, teachers first need to be very familiar with the use of computers themselves which is totaly a different research topic as a whole.

Although this study does not specify any suggestions on how attitudes toward school can be changed or how we can make students read more; the results of this study seem to have an important implication for the field of education that educators, parents and administrators should realize that an intended integration of computer use to students daily and school life may have some unexpected negative effects. Conducting these kinds of studies is important, because possible negative effects of a new method or application to students learning should always be taken into consideration. Today, technology is ubiquitous and technology integration into education is inevitable. However, this pervasiveness of technology should not make educators blind.

Taken together, the results outline some educational implications and stress the importance, from a practical point of view, of integrating computers and technology in students' life for both school and home for educational and entertainment purposes. Fisrt of all a well trained and effective teacher who use technology for educational purposes efficiently is needed for positive learning outcomes. To this end, teachers should be invited to enhance students' effective and productive use of computer. Computer use at home should be guide by parents and teachers as well. Advising students, teachers and parents to manage their daily time to use computers effectively enough for both educational and entertainment purposes. This can be done by interconnecting enthusiasm, mastery goals, showing the meaning of what purposes computers are used for, stimulating curiosity and giving – wherever possible – practical demonstrations or examples, and being role models as well (Pekrun, 2006). Computers can be functional tools for education, but this is determined on the student's interest in the genuine topics. Computers should, thus, be included into the learning process in a way that not only enlarges the fields of exercises but also increases student's motivation.

Overall, mixed discussion in the literature suggests that the relationship between technology and student achievement or attitude to school and sucjects or reading is not only complex, but is also constantly evolving research area. With the rapid increase in the number of computers at homes, in the workplace, and in schools, teachers and parents also need to reconsider their practices. For forther precise concluding remarks, carefully designed research—both controlled and etnographic—is necessary to explore the complexities of this causal relationship. This would incorporate defining where these interrelations and causalities are coming from, and what are the categories of cognitive practices that carry over from one computer activity to the next. Such studies could also take the human factor into consideration and shed light on the complexities of human being ny means of human computer interaction and learning formation, from the perception of the students, the teachers and the parents as well.

It is particularly important in the light of current literature and these findings, there are several steps which might be taken by educators in order to promote effective and timely use of computer. Since the results of this study have shown that both incidental computers use at home and specific school-based computer experience have a collective effect, parents should be advised to become more conscious and helped to understand the importance of using a computer at home within determined lititations and scope, even if its use is not directly for

educational purposes. Teachers should also encourage students to use their computers more consciously for both educationa and entertainment or communication purposes.

Limitations and Future Research

Although the sample size is quite large, the size alone does not automatically guarantee generalizability of the study because the study's scope is 15 years old Turkish students who took the PISA test. Besides, there are limitations of this study inevitably:

In this study the variable attitude towards school is used as if students like going to and being at school or not. The only concern is that the attitude toward school is a long-term, continuing variable that is updated over time. However, for the PISA data used for this study students were asked if they like going to school and being at school or not and this data is used as an endogenous variable.

Although further studies are needed before a definite conclusion may be reached, the present study suggests that, while there is a negative correlation between Internet use and reading enjoyment time and internet use at home and students' attitudes toward school; these variables should be treated separately as well (i.e., as different psychological constructs; students individual differences).Given the negative effects of home computer use there is a need to carry out future research examining the characteristics, content and context of the computer use. More longitudinal research is needed to investigate what really affects students' reading enjoyment times and attitudes towards school. There might be other factors like family support, economic status and teachers' approach to tablet or computer use. Such study might also scrutinize any association between early involvement with computer games at home and more serious and extended use of computers in later life. Additional research also necessities to inspect practical interventions by teachers to close the gap between home and school computer use.

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