First	cteristic	s and quality assess	Sample	Review Char Year Range Earliest -	unique effects racteristics Sample Age Restrictions		istics for studies providin			_	Lit.	Dual	ty Assess	Studie:		
	2020	Include: Experimental designs	None specified	2009- 2019	School-age Children (Early Primary, Elementary)	•	Literacy: Listening comprehension Literacy: Phonics Literacy: Phonomic awareness Literacy: Reading comprehension Literacy: Reading fluency		Intervention: Literacy (Abracadabra; in schools)	Crit. ³	Search U	L	Qual. ⁶	Listed ⁷	Bias ⁸	Hetero L
Adelantado Renau	2019	Include: Cross- sectional studies	None specified	1982– 2019	Children; Adolescents (5.7-18.0)	•	Literacy: Vocabulary knowledge Learning: General Literacy: General Numeracy: General	•	Screen use: General TV programs and movies: General Video games: General	L	L	L	L	L	L	L
Andrade	7019	Include: Interventions	Include: Overweight and obese	2010– 2017	Children; Adolescents	•	Healthy behavior: Self- efficacy Psychological health: Depression Psychological health: Enjoyment Self-perceptions: General Self-perceptions: Self- esteem	•	Video games: Physically active	U	L	L	U	L	н	L
	2020	None specified Include: Interventions	None specified Include: Autism	2008– 2020 2013– 2015	School-age Children (Primary, Elementary, Middle School) School-age Children (Primary,	•	Learning: Motivation		Video games: Educational (with competition) Intervention: Education (via touch	U	H	Н	Н	H	L	L
Bartel	2015		Exclude: Atypical population (except for delayed sleep phase disorder or insomnia)	2004– 2014	Adolescents (12.2-17.7)	•	Sleep: Duration Sleep: Time to fall asleep	•	Computer use: General Internet use: General Screen use: General (mobile phone) TV programs and movies: General Video games: General	L	L	U	U	L	U	U
Benavides-	2022	Include: Randomised controlled trials and quasi-RCTs. Include: Randomised controlled trials	Exclude: Any disease Mental disorders Include: Math difficulties Include: Regular	1999– 2019 2006– 2018	Adolescents Children		Diet: Fat consumption	•	Intervention: Nutrition (in schools) Intervention: Mathematics	L	Н	L	Н	L	H	L
Blok	2002		students, poor readers or dyslexics Exclude: Severe or multiple disabilities	1990– 2000	All (5.4-11.5)	•	Body composition Cardiometabolic		Intervention: Literacy	U	L	Н	Н	L	Н	L
	2016	Randomised controlled trials Include: Experimental Include: All	Include: Chronic disease None specified	2011– 2018 2004– 2015	Children; Children; Adolescents (6.0-10.4)	•	Physical activity: General Physical health: Muscular fitness Diet: Food intake	•	Video games: Health promoting content Advertising: Unhealthy food	Н	L	L	U	L	L	L
	2020	quantitative designs Include: designs with control groups	None specified Exclude: Brain damage	2006– 2014 2002– 2019	School-age Children Children (3.4-14.3)	•	Cognition: Executive functioning Cognition: Executive Functioning (cognitive		Video games: Numeracy Computer use: Executive functioning training	U	Н	U	Н	H	H	H
		groups				•	(inhibition) Cognition: Executive Functioning (working memory) Body composition Diet: Fat consumption Diet: Fruit and vegetable intake		craming							
Champion	2019	Include: Randomised controlled trials	None specified	2003– 2017	School-age Children (11.4-15.9)	•	General Physical activity: Moderate-to-vigorous intensity Risky behavior: Alcohol consumption		Intervention: Lifestyle risk behaviour (at school)	L	L	L	L	L	L	L
	2014	Include: Experimental; Quasi- experimental Include: pre-post designs with or	None specified	2002– 2012 2001–	School-age Children School-age Children	•	Numeracy: General		Intervention: Dynamic geometry software Screen use: General (in	U	Н	Н	Н	L	L	L
Chen	2017	without control group Include: Experimental designs Include: Randomised controlled trials	None specified None specified None specified	2016 2008– 2019 1982– 2010	(Primary, Elementary) All School-age Children	•	Learning: General	•	Video games: Educational (with competition) Intervention: Reading (in schools)	U	H	U	Н	Н	Н	L
J	2013	Include: Experimental; Quasi- experimental Include: experiemental designs with control group	None specified None specified	1980– 2010 2008– 2013	School-age Children		Numeracy: General		Intervention: Mathematics (in schools) Screen use: General (mobile phone for language learning)	L	Н	H	И	L	L	L
	2022	Include: Longitudinal; Retrospective Include: randomised experimental	None specified Exclude: Disabilities	2004– 2018 2011– 2016	All	•	ADHD Symptoms (Inattention)		Screen use: General Screen use: Reading (vs paper)	U	L	U	Н	L	Н	L
Comeras- Chueca	2021	designs include: randomized and non-randomized controlled trials (control group with no intervention or traditional	Exclude: Disabilities, diseases or disorders, overweight or obese	2008– 2019	All (4.5-11.6)	•	Rody composition: RMI	•	Video games: Physically active	L	U	L	U	L	Н	L
Comeras- Chueca	2021	exercise intervention) Include: randomized and non-randomized controlled with control group with no intervention or traditional	Include: Overweight and obese Exclude: Participants with disabilities, diseases or disorders other	2010– 2020	All (8.0-14.0)	•	Body composition: Fat- free mass	•	Video games: Physically active	L	L	L	U	L	Н	L
Coyne Cunninghan	2018	exercise intervention None Include: Quantitative designs	None specified None specified	1975– 2017 2014– 2018	Children; Adolescents All (11.2-16.8)	•	Body composition: Waist circumference Prosocial Behavior: General Psychological health: Depression		Screen use: Prosocial content Social Media: General (duration)	L	L	L	Н	L	L	L
J	2010	Include: All quantitative designs; Experimental Include: Intervention	None specified None specified	1989– 2009 2006– 2016	Children; Adolescents Children; Adolescents (8.7-16.0)	•	General Body composition		Intervention: Health behaviours Intervention: To promote health (via mobile phone)	U	L	H	H	L	Н	Н
	2022	Include: experimental or observational Include: Quantitative designs	Exclude: Atypically developing Include: Healthy children	1978– 2021 2017– 2019	Children (0.5-11.0) Early childhood; Pre-school	•	Psychological health:		Screen use: General Screen use: General (meeting guidelines)	U	L	L	L	L	L	L
-	2017	None Include: Experimental, correlational, or	None specified None specified	2005– 2017 2009– 2013	Children; Adolescents All (7.8-17.5)	•	activity (initiation of sex)		Screen use: Sexual content Video games: Violent content	U	L	L	H	L	L	L
Folkvord	2018	longitudinal Include: Interventions Include: experimental or quasi-	None specified Exclude: Cochlear implants or	2007- 2018 2002- 2019	Children; Adolescents Early childhood; Pre-school; School-age Children	•	Diet: Food intake (calories) Literacy: Reading comprehension Literacy: Vocabulary		Advertising: Advergames e-Books: General	U	L	L	U	L	Н	L
	2017	experimental Include: Cross- sectional Include:	implants or autism Autism None specified	2019 2006– 2014	Children (Early Primary, Elementary) Adolescents (12.5-16.2)	•	Learning: Educational achievement problems Learning: School attendance problems	•	Internet use: Cyberbullying victimization	U	L	L	U	L	L	L
	2019	Experimental	None specified None specified	NA 2004– 2011	All School-age Children (Primary, Elementary, Middle School)		Learning: General		Intervention: Augmented reality (in schools) Intervention: Writing feedback	U	H	Н	Н	H	L	L
Hammersle <u>r</u> Hao	2016		Exclude: Those with special needs, require a special diet, or have a condition that would limit physical activity Exclude: Disabilities	2003– 2013 2012– 2018	School) Children; Adolescents School-age Children		Body composition		Intervention: To promote healthy weight (obesity prevention) Intervention: English as foreign language	L	L	H	L	L	Н	L
Hassan- Saleh	2021	with control group Include:			_	•	language vocabulary Literacy: Pronunciation	•	Intervention: Pronunciation Intervention: To promote physical activity (via mobile	U	L	L U	L U	H	H H	L
Hernandez- Jimenez	2019	controlled trials Include: Experimental; Quasi- experimental	None specified None specified	2009– 2017 1997–	(9.9-16.6) Children; Adolescents Early childhood; Pre-school; School-age	•	Body composition	•	phone) Video games: Physically active Intervention: Literacy	U	L	Н	L	L	L	L
lvie	2020	Include: Correlational studies Include: Experimental;	None specified Include: Healthy	2018 2012– 2019 2007–	School-age Children (Early Primary, Elementary) Adolescents (14.0-18.0) Children	•	Psychological health: Depression	•	Intervention: Literacy videos Social Media: General Screen use: General	U	L	L	H	L	L	L
Kates	2020	Cross-sectional; Longitudial None Include: experimental or quasi-	Include: Healthy children None specified None specified	2007– 2019 2008– 2016 2010– 2018	School-age Children School-age Children (Early Primary,	•	Learning: General Learning: Literacy and numeracy Literacy: General	•	Screen use: General Screen use: General (mobile phone) Screen use: Educational apps	U U	H L	L L	H L	H	U L	L
Kroesberge Kucukalkan	2003	experimental Include: Within subject design; between subject design Include: Experimental	Include: Math difficulties Include: Dyscalculia	1985– 1999 2007– 2016	Primary, Elementary) School-age Children (Primary, Elementary) (7.0-11.3) School-age Children (Primary,	•	Numeracy: General Numeracy: General		Intervention: Mathematics (via computer in classrooms) Intervention: Mathematics	U	L	U	H	L	H	L
Li	2019	Experimental Include: Experimental; Quasi- experimental Include:	Dyscalculia None specified Include:	2016 1991– 2005 2012–	(Primary, Elementary) School-age Children	•	Numeracy: General Numeracy: General Developmental: Gross motor (locomotor) Developmental: Gross	•	Mathematics Intervention: Mathematics Intervention: Active	U	L	L	U	L	Н	L
	2022	Randomised controlled trials Include: experimental or quasi-experimental	Atypically developing None specified	2012– 2020 2014– 2021	Children; Adolescents All School-age	•	motor (non-locomotor) Developmental: Gross motor (object control skills) Learning: Computational thinking	•	video games for motor skills Computer use: Programming exercises	U	Н	L	Н	L	H L	L
	2008	Include: All quantitative designs Include: Randomised controlled trials	None specified None specified	1990– 2003 1999– 2012	Children (Primary, Elementary) Children; Adolescents (4.0-14.7)	•	Learning: General Body composition Psychological health: Anxiety	•	Intervention: Education (via computer) Intervention: Screentime reduction	U	H	Н	L	H	H	H
	2019	Include: All quantitative designs Include: studies with control group	None specified None specified	2007– 2014 NA	All (13.3-16.6)	•	Anxiety Psychological health: Depression Psychological health: Satisfaction Cognition: Creativity	•	Social Media: Instant messaging Video games: General Screen use: General	U	L H	U	Н	Н	L	L
Lu	2021	Include: Cross- sectional only	Include: Healthy only	2014– 2018	Adolescents		Negative coping style Psychological health: Positive coping style	•	Screen use: General (mobile phone addiction) Intervention: Education (general) Screen use: General Screen use: General (coviewing)	U	L	Ū	L	L	L	L
Madigan	2020	Include: Observational Exclude: Qualitative	Exclude: Asd or intellectual disability	1973– 2019	Children (0.5-10.6)	•	Literacy: General	•		U	L	L	U	L	L	L
Major	2021	Include: Randomised controlled trials	None specified	2007– 2020	Children; Adolescents	•	Cognition: Cognitive Functioning Cognition: Executive functioning		Intervention: Literacy (Abracadabra; in schools)	U	L	L	Н	L	L	L
Mallawaara	2022	Include: Cross- sectional or longitudinal	Include: Non- clinical	2014– 2020	Early childhood; Pre-school (1.4-5.4)	•	Developmental: General Developmental: Language or speech Psychological health: Psychosocial factors Psychological health: Self-regulation Sleep: General	•	Screen use: General (mobile phone or tablet)	L	L	L	L	L	L	L
Mares	2005	None	None specified	1969– 1989	Children	•	Prosocial Behavior: Altruism Social interactions: General	•	TV programs and movies: General	U	L	Н	Н	L	Н	Н
Mares	2013	None	None specified	1973– 2010	Children	•	Cognition: Moral reasoning and perception of outgroups Learning: General Learning: Literacy and numeracy Learning: Physical and social environment		Intervention: Sesame Street	U	Н	Н	Н	L	Н	L
Marshall	2004	None Include: All quantitative	None specified None specified None specified	2001–15 1985– 2002 2003– 2018	All (6.0-12.2) Children; Adolescents	•	Body composition Body composition Physical activity: General Aggression: Towards	•	Video games: General TV programs and movies: General Video games: General Screen use: General	U U	L	H H	L H	L H	L H	L
Martins	2019 2022	quantitative designs Include: Cross- over or parallel randomized controlled trials Include: Randomised	None specified Exclude: Contraindictions to physical activity	2003- 2018 2006- 2017 2015- 2019	Children; Adolescents	•	peers Diet: Food intake (calories)	•	TV programs and movies: Mealtime Intervention: To promote physical	L	L	L	H L	L	H L	L
McArthur	2012	Randomised controlled trials Include: Randomised controlled trials and quasi-RCTs. Include: Randomised	activity Intellectual and cognative impairments Include: Poor readers Include: Poor	2019 1994– 2009	(10.3-17.8) All (6.7-16.2) Children;	•	General Literacy: Phonics	•	activity (via gamification) Intervention: Literacy (phonics; via computer)	L	L	L	L	L	L	L
	2018		Include: Poor readers None specified	1994– 2015 2004– 2018	Children; Adolescents Adolescents (13.5-16.8)	•	Sleep: Duration Sleep: Problems Sleep: Time to fall asleep	•	Screen use: General (excessive) Screen use: Virtual	U	H	U	L	L	Н	L
	2014	Include: Experimental with control group Include: random assignment or	None specified Include: Poor	NA 2004–	School-age Children School-age Children		Learning: General	•	reality simulations (Educational) Screen use: Virtual reality worlds (Educational) Video games: Virtual reality (Educational)	U	L	н	Н	Н	н	L
	2022	assignment or quasi- experimental Include: Group- control experimental	Include: Both typically developing and atypically developing with	2020 2006– 2018		•	Cognition: Cognitive Functioning Cognition: Executive functioning Cognition: Verbal skills Cognition: Visuospatial skills	•	Intervention: Reading (technology supported) Intervention: Cognitive training	U	L	H	Н	L	H	H
Paik	1994	design	developing with neurodevelopmer disorder None specified	NA	Children; Adolescents	•	skills Numeracy: General Psychological health: Adjustment Antisocial Behaviour: General	•	TV programs and movies: Violent content	U	Н	U	Н	Н	L	Н
	2016	quantitative designs	None specified Include: Healthy populations only	1986– 2012 2001– 2010	Children; Adolescents Children; Adolescents	•	Cardiometabolic health: Maximum oxygen consumption Physical activity: Energy expenditure Physical activity: Heart		TV programs and movies: Scary content Video games: Physically active	U	L	H	H	H	Н	L
	2013	experimental designs	None specified None specified	1985– 2012 2008– 2017	All (8.9-16.0)	•	rate Cognition: Information processing		Video games: General Video games: Violent content	U	L	U	Н	L	L	L
	2022	None specified Include:	Exclude: Neurological disorder	2017 2016– 2020	(8.9-16.0) Children; Adolescents		Psychological health:		Intervention: To improve emotional regulation Intervention: To improve emotional regulation (via digital games)	Н	L	L	L	L	L	L
Rodriguez- Rocha Sadeghirad	2019	Experimental; Quasi- experimental Include:	None specified None specified	1999– 2018 1978– 2014	All (4.5-15.4) Children; Adolescents (3.8-11.0)	•	vegetable intake Diet: Food intake (calories) Diet: Food intake (grams) Diet: Unhealthy food		Intervention: Fruit and vegetable Advertising: Unhealthy food	И	L	L	L	L	L	L
Scherer Schroeder	2020	experimental designs Include: Experimental; Quasi-	Exclude: Clinical or special needs populations None specified	1973– 2017 2001– 2009	All (6.5-16.8)	•	choice Learning: Programming skills		Intervention: Education (programming) Intervention: With digital characters	U	H	U	Н	L	L	L
	2019	experimental Include: Interventions Include:	None specified Include: No health	2009– 2019 2013–	Children (4.3-6.1) Children; Adolescents	•	Cognition: Executive functioning Body composition	•	Intervention: Cognitive training Intervention: To promote health (via mobile phone app) Intervention: To promote health (via	L	L	L	H	L	L	L
	2019	Interventions Include:	health conditions except obesity None specified	2013– 2018 2003– 2021		•	Physical activity: General Screen time: General	•		L	Н	L	L	L	H	L
	2014	Randomised controlled trials; Quasi-experimental; Observational Include: experimental	None specified Include: No	2000– 2011	School-age Children (Primary, Elementary) Early childhood; Pre-school; School-age Children		Science: General		Intervention: Science (in schools) Screen use: Video (vs	U	Н	H	Н	L	Н	Н
	2021	experimental and quasi- experimental designs Include: Experimental; Quasi- experimental	Include: No developmental delay	1994– 2019 1980– 2014	School-age Children (Early Primary, Elementary) (0.8-6.5)	•	Learning: General		Screen use: Video (vs face-to-face) e-Books: Narration	Н	L	U	Н	H	L	L
Takacs	2019	Include: Randomised controlled trials and quasi-RCTs.	None specified	2001– 2016	Children	•	Cognition: Executive Functioning (inhibition) Cognition: Executive Functioning (working	•	Intervention: Education (via computer)	L	L	U	Н	L	L	L
	2019	None Include: desgins with a control group	None specified None specified	2010– 2015 2006– 2016	All School-age Children	•	Functioning (working memory) Learning: General		Intervention: Augmented reality (in schools) Video games: Educational	U	Н	U	U	L	L	L
Vahedi	2018	group Include: Interventions (pre-post or controlled). Exclude: Cross- sectional Include: Prospective	None specified None specified	2015- 2016 2005- 2015	School-age Children (Middle/High School) School-age Children		Risky behavior: Media literacy Risky behavior: Risk taking (attitude)	•	Intervention: Media literacy (web-based) Computer use: General TV programs and	L	L	U	U	L	L	L
	2020	design Exclude:	None specified None specified		(2.0-16.3) Adolescents (12.6-18.0)	•	Risky behavior: Risk taking (general)		TV programs and movies: General Social Media: General	U	L	U	Н	L	L	L
Wouters	2013	None Include: experimental designs Include: Experimental with control	None specified Exclude: Disabilities None specified	1954– 1980 2005– 2012 1993– 2007	School-age Children (5.0-17.0) All	•	Learning: Motivation	•	TV programs and movies: General Video games: Educational Video games: Educational (with	U U	U H	H U	U H	L	H L	H L
Xie	2013	with control group Include: Experimental; Quasi- experimental; Pre-test post- test Include: experimental,	None specified	2010– 2018	Children (1.8-5.9) Early	•	Learning: General		Intervention: Education (via touch screen)	U	L	L	Н	L	L	L
	2018	quasi- experimental, or pre-post test None specified Exclude: Non-	Exclude: Health conditions None specified	2010– 2018 2006– 2016	childhood; Pre-school (1.8-5.8)	•	Psychological health: General Psychological health: Positive mental health		Screen use: Touchscreens Social Media: General	U	Н	U	Н	L	L	L
	2020	empirical studies; Qualitative; Systematic reviews or meta- analyses Include: Randomised controlled trials;	None specified	2009– 2018 1997–	All School-age Children	•	Healthy behavior: General Healthy behavior: Self- efficacy Psychological health: Enjoyment Literacy: Decoding Literacy: Reading		promoting content	U	L	U	Н	L	L	L
¹ Items are fro ² Where provi ³ Eligibility cri ⁴ Literature se ⁵ Dual independ	om the ded teria pr earch st ndent s	Quasi- experimental; Observational National Health, Lun edefined and specifi rategy comprehensiv creening & review quality assessment	ed ve and systematic	2006 e's Quality Ass	(Primary, Elementary)	•	Literacy: Reading comprehension		e-Books: General es tool. Note that we exclud	L ed the fi	L rst item c	U	H ol.	L	Н	
	dies list bias ass	ed with important c	haracteristics and res	sults of each												