



## POLICY BRIEF

# Autism and Inclusive Education: Recommendations for improvement during and after COVID-19

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## Abstract

**Context:** COVID-19 has disproportionately affected the autism community yet also provided an opportunity to improve education delivery. There are several policies to ensure education for autistic children, but there are still gaps that need to be filled.

**Policy Options:** This policy brief analyses several interventions designed to create a more inclusive education environment for autistic children. The four policy options described and analyzed are: Teacher assistants focussing on children with special education needs, Peer Mentoring Interventions (PMI), Digitalization of Education, and Gamification.

**Recommendations:** The analysis concludes that PMI and Gamification would be the most feasible to implement. PMI can improve the dynamic between autistic children and their neurotypical peers. Gamification enables personalization to educational needs and fluid transition to at-home education. Subsequently, the European Union already invests in gamification, making the step smaller to invest in gamification for inclusive education.

**Keywords:** Autism, Special Education Needs (SEN), Policy, Education

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## Introduction

### Autism

Autism spectrum condition (henceforth autism) is a neurodevelopmental condition characterized by impairments in social communication and inconsistent restrictive or repetitive behavior (1,2). The global prevalence of autism is estimated at around 1%, with the condition affecting 2 to 3 times more men than women (3–5). About 70% of autistic people experience co-occurring conditions, such as intellectual disabilities and depression (4). Autistic people show a wide variety of characteristics associated with the autism diagnosis and with a wide range of severity from very mild to severe (6). Consequently, there is a lot of variation in the kind and amount of support they need to achieve relative independence (2). Autistic children are shown to benefit from inclusive education and interaction with neurotypical peers in general (7,8).

### Current framework

There are two international policies in place to ensure the rights of people with disabilities and education: the United Nations in the Universal Declaration of Human Rights (UDHR) and the Convention on the Rights of Persons with Disabilities (CRPD). The UDHR promotes and protects the rights of autistic children. It states that education is a fundamental human right and is "directed to the full development of the human personality" (9). The CRPD was the first international, legally binding treaty that focused on the Human Rights of people with disabilities specifically. When signed, member states are obliged to respect the needs of people with disabilities, including autism, such as the right to education (10). The Disability Rights in Education Model (DERM) offers a guidance tool that provides a multilevel framework for evaluating aspects of inclusive education at international, national, and local levels. It

also provides an overview of key domains relevant to the development of inclusive education (8).

### COVID-19 and social inclusion

Social inclusion is defined as improving the terms of participation in society, particularly for disadvantaged groups, through enhancing opportunities, access to resources, voice, and respect for rights (11). Whereas a socially inclusive society is seen as a society where people feel valued, differences are respected, and basic needs are provided so that each individual can live with dignity. Moreover, social exclusion is defined as the process of being left out from the social, economic, political and cultural systems which contribute to the integration of a person into the community (12). Apart from the given opportunity COVID-19 provides us to alter the current position of social inclusion, it must be stated that social inclusion is also one of the clear objectives of the European Union and their agenda set during the Lisbon Convention in 2000. This highlights the need for a proper strategy to achieve social inclusion and eventually their relation to inclusive education. This has been on the European agenda for more than twenty years. Being on the European agenda for over twenty years and not being fully achieved yet indicates the challenges the society experienced before COVID-19 imposed on achieving social inclusion (8).

### Context

It is essential to ensure education for autistic children because education is a human right (10). Many frameworks, guidelines, and policies are already in place, usually regarding children with special education needs and not specific for autistic children (13–18). There is still a gap between the current and desired situation. In the next chapter, several policy options will be discussed to tackle the issue. The COVID-19

pandemic presents a unique opportunity for change and opens up a policy window. The pandemic has afforded glimpses of how quickly the world could change (19), for example, the speed and extent of some of the responses by governments (20,21), like the switch to online education and hybrid learning (19,22). Since COVID-19 changed how our society could operate, this provides us an opportunity to put social inclusion higher on the European agenda and address inclusive education accordingly. Three political streams contribute to whether an issue will gain entrance onto the agenda: the problem, the policy, and the politics. The policy streams model of Kingdon argues that each of the three streams runs independently from the others, and it is only when all three streams converge that a window of opportunity opens for a given issue (23). The window of opportunity is when a given initiative is most likely to be acted upon and passed. Policy windows rarely present themselves, and advocates must capitalize during this time because the potential of another opportunity is uncertain (23). In this context, the problem stream refers to the substandard education delivery to the autism community. The policy options presented below represent possible approaches that the policy stream can take to improve education delivery.

### **Policy options**

Based upon the Kingdon model, we formulated the following policy options. We evaluated the possibilities of children with Special Education Needs (SEN), of which autistic children are part. Therefore, policy options that would work for children with SEN should also positively affect autistic children and vice versa.

#### **Option 1: Teaching assistants focus on SEN children**

One of the recommendations to improve the quality of inclusive education while

maintaining a high level of individual focus for children with SEN is using teaching assistants (TAs) next to a teacher in classrooms. In this context, a TA is seen as school staff in pupil and classroom-based support roles while working mainly with individuals with SEN. The focus of a TA lies specifically upon having more paraprofessional experience with children needing special attention; therefore, this can be potentially helpful to increase the quality of inclusive education (24). TAs have a seemingly positive impact on learning outcomes; however, evidence remains somewhat inconsistent (25). When the TAs are *explicitly* trained to deliver these programs, studies show that this has a beneficial outcome on the learning results of children with SEN (26). In other words, positive learning outcomes are strongly associated with teachers and TAs working together effectively next to the quality of preparation and training they are given. One of the main arguments for using TAs is their ability to reduce the workload and stress a teacher experiences. Teaching a classroom with inclusive education creates an opportunity to maintain a high quality of educational services to individuals with specific needs and individuals without specific needs (27). The arguments given for the use of TAs in classrooms show that it is crucial for future research to focus on international research, such as the perspectives of this role and the impacts TAs might have on inclusive education.

Moreover, research should focus on finding the most appropriate type of training for TAs and seeing how teachers and TAs can work together effectively. Different methodological approaches should be used in order to facilitate research more efficiently. An example of a well-developed implementation to use teaching assistants in inclusive education can be found in the national policies of Latvia. One of their

strategies entails the use of certain conditions. As an example, assistant services were introduced next to specific requirements for persons wanting to deliver these services. However, Latvia failed to address the definition of inclusive education in its entirety; thus, some minor limitations might occur (28).

### **Option 2: Peer Mentoring Interventions to improve social skills**

One type of intervention that has shown promising results in inclusive educational settings and is already widely used is peer mentoring intervention (PMI) (7). Within PMI, one or multiple peers are connected to the autistic child to help with practice and learn social behaviors within a typical social setting. It may be well-suited for implementation in the school setting as autistic children can have more active time within the intervention without the intervention putting a lot of responsibilities on the teacher. However, it may put extra pressure on the peer chosen to participate (7). It is important to evaluate how intensive the intervention needs to be and how many peers will be PMI encourages more interaction between autistic children and their peers and has shown to be effective in teaching autistic children social skills (7,29). There are different PMI strategies, which strategy will have the most effect depending on the child's characteristics (29). When looking for school-based interventions, generalizability is essential (30). Through interventions aimed at achieving high levels of generalizability, the possibility of transferring the interventions to broader settings is more likely. This would improve the quality of the presented policy options, and thus the chances of successful implementation to a wider extent would increase. Most studies with good generalizability had similar criteria, with fitting characteristics of the children (29).

Other interventions possible, including different technological interventions that positively affect social skills. Moreover, PMI has the benefit that it can be incorporated in daily activities (29,31). It is also possible to make use of multicomponent PMIs, which combine indirect strategies like technological interventions with PMI (7). These multicomponent PMIs show substantial gains in communication and reduction in isolation to no treatment.

### **Option 3: Digitalization to improve inclusive education**

Digital education has gained massive popularity since the COVID-19 pandemic (22,32). The need for online education had never been this demanding in the short timeframe available. Huge changes were made and after 1.5 years, we are all familiar with hybrid working or education. But even before the COVID-19 pandemic, the interest in online education was present. For example, a meta-analysis found technology and online learning valuable for all children when the teaching strategies are diverse, such as tutorials, simulations, and word processing (33).

On top of that, collaboration between peers should be encouraged, the child itself should be in control of their learning speed, and consistent feedback should be given. Children with SEN also benefit from these interventions, and research found multimodal learning to be especially helpful, which offers education in the forms of images, videos, animations, and recordings. This helps children with SEN engage in technology in their learning (34–36). Other benefits found by research are mentioned in box 1. However, children with SEN have individual needs and learning difficulties that need to be taken into account to achieve the best outcome. Repetition and consistency of used methods are required to keep these children

engaged in online learning, and improve the personal experience of online education (37).

**Box 1.** Examples of benefits of digital education

- *The combination of audio, video, text and other means to convey meaning has the potential to provide children greater access to curricula and learning opportunities and additional ways to demonstrate their understanding (38)*
- *Individual pace of learning, lack of distractions, better meaningful social contact (39)*

**Option 4: Games and education: the perfect fit**

One form of digital education is gamification. Gamification uses game elements and design techniques to teach skills in a playful way (40). It is crucial to keep the users engaged on intrinsic motivation instead of for rewards

given by the game. This can be done with the right balance of mechanics, dynamics, and aesthetics, as seen in the MDE model (see table 1; (41). Gamification is already in use in educational settings (42). It shows a lot of potential in the educational background to empower neurotypical children as children with SEN and impact their motivation and academic skills (40,43). An advantage of gamification is that there are options to personalize the software to the child's needs, whether this is on the graphics or difficulty of the content (44). Due to this, it should be possible to make one gamification program customizable to both the needs of neurotypical and special needs children. Autistic people tend to have an interest in computerized learning (31,43). However, it is unclear whether they can apply the learned skills to real-life situations (44).

**Table 1.** MDE model term explanation

term	explanation	examples
Mechanics	Actions offered to players in the game	Draw cards Attack trade
Dynamics	Behaviors players show during the run-time of mechanics	Socializing Bluffing attention
Aesthetics	Sensory formation of the game in order to evoke desired emotional responses in the players.	Challenge: obstacle course narrative: drama fellowship: social framework

**Policy recommendations**

Based on the Kingdon model, we assessed the three policy streams and regarding the policy

options mentioned previously. We discovered that the lack of resources and trained professionals is one of the main

reasons interventions have a smaller chance of success. Based on assessments, we recommend PMI or gamification as the most feasible interventions to improve inclusive education for autistic children.

### **PMI settings in inclusive education benefit for implementing as policy recommendation:**

Generally, PMI settings focus on a particular targeted approach, whereas peers of the target children (primarily children with SEN) receive training which enables them to provide necessary tutoring and guidance for children with educational, social, or behavioral concerns (45). Through PMI, the peers can demonstrate "appropriate" behavior themselves, which might be an incentive for people with special needs to act accordingly. Mostly, the peers are chosen from the specific classrooms themselves, after which they receive the appropriate training. During peer intervention, these peers are also closely observed when they perform assistance to individuals in SEN settings. Some studies argue that implementing PMI settings is time-consuming and may oppose some challenges, such as demonstrating the appropriate techniques to peers. However, it is shown that PMI settings are beneficial for improved inclusion of target children in their peer group. More specifically, PMI settings are an effective technique to improve education for autistic people (45).

Whilst Chan et al. (42) argue that implementing PMI settings is more likely to be an effective intervention for autistic children; there are more arguments which favor this policy option. As this option requires the use of people within the same age group, this automatically demonstrates that there is never a shortage of peers. Therefore, once this setting is appropriately implemented, it is highly likely that this option will be an automatic ongoing process.

Secondly, observational learning through peers likely positively influences children with difficulties, they are less intimidated by peers than teachers. This is potentially effective for autistic people as instruction and feedback from peers are more likely to be followed. Moreover, PMI research has been done in multiple settings, including autism, problematic behavior, and ADHD conditions, and in all these settings, PMI is shown to be effective. Therefore, PMI is potentially effective in multiple settings, making them more cost-effective considering their relatively expensive implementing costs (46,47).

### **Gamification**

Due to the current changes towards online education hybrid learning due to COVID-19, there is now a window of opportunity to implement gamification. Gamification is offered digitally and can thus also be implemented if, for any reason, online education would come back in the future, ensuring a smaller shift in an educational setting than what happened in the current situation. Gamification and digital education show positive results for both neurotypical children and children with SEN, including autistic children (31,33,37,43). As gamification can be personalized to a certain extent, it would be possible to use the same gamification software for both neurotypical children autistic children (44,48). Some of these personalization styles could be manually adjusted by the children, teachers, or parents, while difficulty generally is personalized based on algorithms. It is not clear whether the same gamification program can be used for both neurotypical and autistic children, even with personalization. This would generally also depend on the level of personalization possible. If a program has different settings focused on neurotypical children or various types of SEN children, it could be a promising program for implementation (48). The EU also already

invests in gamification in education. There is a possibility to widen the use of the investment in gamification also to address the need for improved inclusion of autistic children in education (49).

## Conclusions

Due to the rapid digital transformations resulting from COVID-19 (50), improvements in inclusive education for children with SEN are vital. Based on Kingdon's policy streams theory, a policy window is currently making to change the current status quo of education delivery for children with SEN – also known as the problem stream in this context. Multiple options that can fit in the paradigm of Kingdon's policy stream were identified in this policy brief. The use of PMI and gamification turned out to be the most promising. Key advantages of PMI entail the inclusion of peers as mentors, which creates a positive dynamic between autistic children and their peers and can positively affect the educational outcome of autistic children if implemented properly. Key advantages of gamification entail its versatility and the

option to personalize it according to individual needs.

COVID-19 has significantly influenced our systematic search, as research on this topic has increased in popularity since the pandemic's start. Many of the interventions addressed are in the early stages, which raises the question of how transferable these interventions are. The outcome presented within this policy brief might be different in a few years due to the rapid developments of the COVID-19 pandemic or the long-term evaluation of interventions. Subsequently, with regards to the Kingdon streams model, addressing the politics stream does not apply within the scope of this policy brief.

As a future large-scale public health threat is likely to occur, gamification enables a more fluid transition to at-home education. Generally, existing research shows no adverse outcome to the use of gamification. Subsequently, the European Union already invests in gamification, making the step smaller to invest in gamification for inclusive education.

## References

1. American Psychiatric Association. *Diagnostic And Statistical Manual of Mental Disorders* [Internet]. 5th ed. 2013 [cited 2021 Dec 7]. Available from: <https://dsm.psychiatryonline.org/doi/abs/10.1176/appi.books.9780890425596>
2. Campisi L, Imran N, Nazeer A, Skokauskas N, Azeem MW. Autism spectrum disorder. *British Medical Bulletin*. 2018 Sep 1;127(1):91–100.
3. Elsabbagh M, Divan G, Koh Y-J, Kim YS, Kauchali S, Marcín C, et al. Global Prevalence of Autism and Other Pervasive Developmental Disorders. *Autism Research*. 2012;5(3):160–79.
4. Lai M-C, Lombardo MV, Baron-Cohen S. Autism. *Lancet*. 2014 Mar 8;383(9920):896–910.
5. Roman-Urrestarazu A, van Kessel R, Allison C, Matthews FE, Brayne C, Baron-Cohen S. Association of Race/Ethnicity and Social Disadvantage With Autism Prevalence in 7 Million School Children in England. *JAMA Pediatrics*. 2021 Jun 7;175(6):e210054.
6. Lord C, Elsabbagh M, Baird G, Veenstra-Vanderweele J. Autism spectrum disorder. *Lancet*. 2018 Aug 11;392(10146):508–20.
7. Dueñas AD, Plavnick JB, Goldstein H.

- Effects of a Multicomponent Peer Mediated Intervention on Social Communication of Preschoolers With Autism Spectrum Disorder. *Exceptional Children*. 2021 Jan 1;87(2):236–57.
8. Kessel R van, Hrzic R, Cassidy S, Brayne C, Baron-Cohen S, Czabanowska K, et al. Inclusive education in the European Union: A fuzzy-set qualitative comparative analysis of education policy for autism. *Social Work in Public Health* [Internet]. 2021 Feb 3 [cited 2021 Nov 23]; Available from: <https://www.tandfonline.com/doi/full/10.1080/19371918.2021.1877590>
  9. United Nations. Universal Declaration of Human Rights [Internet]. United Nations; 1948 [cited 2021 Dec 5]. Available from: <https://www.un.org/en/about-us/universal-declaration-of-human-rights>
  10. United Nations Enable. Convention on the Rights of Persons with Disabilities (CRPD) | [Internet]. 2008 [cited 2021 Dec 5]. Available from: <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>
  11. Curran C, Burchardt T, Knapp M, McDaid D, Li B. Challenges in Multidisciplinary Systematic Reviewing: A Study on Social Exclusion and Mental Health Policy. *Social Policy & Administration*. 2007;41(3):289–312.
  12. Cappo D, Social Inclusion Board. 'Social inclusion initiative.' Social inclusion, participation and empowerment. Address to Australian Council of Social Services National Congress. [Internet]. 2002 [cited 2021 Dec 5]. Available from: <https://www.google.com/search?q=Cap>
  13. Roleska M, Roman-Urrestarazu A, Griffiths S, Ruigrok ANV, Holt R, Kessel R van, et al. Autism and the right to education in the EU: Policy mapping and scoping review of the United Kingdom, France, Poland and Spain. *PLOS ONE*. 2018 Aug 30;13(8):e0202336.
  14. van Kessel R, Walsh S, Ruigrok ANV, Holt R, Yliherva A, Kärnä E, et al. Autism and the right to education in the EU: policy mapping and scoping review of Nordic countries Denmark, Finland, and Sweden. *Molecular Autism*. 2019 Dec 11;10(1):44.
  15. Bunt D, van Kessel R, Hoekstra RA, Czabanowska K, Brayne C, Baron-Cohen S, et al. Quotas, and Anti-discrimination Policies Relating to Autism in the EU: Scoping Review and Policy Mapping in Germany, France, Netherlands, United Kingdom, Slovakia, Poland, and Romania. *Autism Research*. 2020;13(8):1397–417.
  16. van Kessel R, Hrzic R, Czabanowska K, Baranger A, Azzopardi-Muscat N, Charambalous-Darden N, et al. Autism and education—international policy in small EU states: policy mapping in Malta, Cyprus, Luxembourg and Slovenia. *European Journal of Public Health*. 2021;31(1):1–7.

- Health. 2020 Dec 11;30(6):1078–83.
17. van Kessel R, Steinhoff P, Varga O, Breznoščáková D, Czabanowska K, Brayne C, et al. Autism and education—Teacher policy in Europe: Policy mapping of Austria, Hungary, Slovakia and Czech Republic. *Research in Developmental Disabilities*. 2020 oktober;105:103734.
  18. van Kessel R, Siepman I, Capucha L, Paschalis AK, Brayne C, Baron-Cohen S, et al. Education and austerity in the European Union from an autism perspective: Policy mapping in Ireland, Portugal, Italy, and Greece. *European Policy Analysis*. 2021;7(2):508–20.
  19. Onyema EM, Eucheria NC, Obafemi FA, Sen S, Atonye FG, Sharma A, et al. Impact of Coronavirus Pandemic on Education. *Journal of Education and Practice*. 2020;11(13):108.
  20. Djalante R, Lassa J, Setiamarga D, Sudjatma A, Indrawan M, Haryanto B, et al. Review and analysis of current responses to COVID-19 in Indonesia: Period of January to March 2020. *Progress in Disaster Science*. 2020 Apr;6:100091.
  21. Bosa I, Castelli A, Castelli M, Ciani O, Compagni A, Galizzi MM, et al. Response to COVID-19: was Italy (un)prepared? *Health Econ Policy Law*. 2020;1–13.
  22. Hebebcı MT, Bertiz Y, Alan S. Investigation of Views of Students and Teachers on Distance Education Practices during the Coronavirus (COVID-19) Pandemic. *International Journal of Technology in Education and Science*. 2020 Sep 1;4(4):267–82.
  23. Kingdon, John W. *Agendas, Alternatives, and Public Policies*. [Internet]. New York, NY: Longman; 1984 [cited 2021 Dec 7]. Available from: [https://maastrichtuniversity.on.worldcat.org/atoztitles/link?url\\_ver=Z39.88-2004&rft.genre=book&rft\\_id=info:sid/wiley&rft.aufirst=John%20W.&rft.aulast=Kingdon&rft.date=1984&rft.btitle=Agendas,%20Alternatives,%20and%20Public%20Policies&rft.pub=Longman](https://maastrichtuniversity.on.worldcat.org/atoztitles/link?url_ver=Z39.88-2004&rft.genre=book&rft_id=info:sid/wiley&rft.aufirst=John%20W.&rft.aulast=Kingdon&rft.date=1984&rft.btitle=Agendas,%20Alternatives,%20and%20Public%20Policies&rft.pub=Longman)
  24. Webster R, de Boer AA. Teaching assistants: their role in the inclusion, education and achievement of pupils with special educational needs. *European Journal of Special Needs Education*. 2021 Mar 15;36(2):163–7.
  25. Shahidi S, Avizhgan M. Designing, implementing, and evaluating the process of training advisor and teaching assistant at Isfahan medical school. *Journal of Education and Health Promotion*. 2021 Jan 1;10(1):34.
  26. Webster R, De Boer A. Teaching assistants: their role in the inclusion, education and achievement of pupils with special educational needs. *European Journal of Special Needs Education*. 2019 May 27;34(3):404–7.
  27. Breyer C, Lederer J, Gasteiger-Klicpera B. Learning and support assistants in inclusive education: a transnational analysis of assistance services in Europe. *European Journal of Special Needs Education*. 2021 May 27;36(3):344–57.
  28. van Kessel R, Dijkstra W, Prasauskiene A, Villeruša A, Brayne C, Baron-Cohen S, et al. Education, Special Needs, and Autism in the Baltic States: Policy Mapping in Estonia, Latvia, and Lithuania. *Frontiers in Education*. 2020;5:161.
  29. Watkins L, O'Reilly M, Kuhn M, Gevarter C, Lancioni GE, Sigafos J, et al. A review of peer-mediated social interaction interventions for students with autism in inclusive settings. *J Autism Dev Disord*. 2015 Apr;45(4):1070–83.

30. Bellini S, Peters JK, Benner L, Hopf A. A Meta-Analysis of School-Based Social Skills Interventions for Children With Autism Spectrum Disorders. *Remedial and Special Education*. 2007 May 1;28(3):153–62.
31. Grynspan O, Weiss PLT, Perez-Diaz F, Gal E. Innovative technology-based interventions for autism spectrum disorders: a meta-analysis. *Autism*. 2014 May;18(4):346–61.
32. Kipp M. Impact of the COVID-19 Pandemic on the Acceptance and Use of an E-Learning Platform. *Int J Environ Res Public Health*. 2021 Oct 29;18(21):11372.
33. Hattie J. *Visible learning: a synthesis of over 800 meta-analyses relating to achievement*. Reprinted. London: Routledge; 2010. 378 p.
34. Fasting R, Lyster S-A. The effects of computer technology in assisting the development of literacy in young struggling readers and spellers. *European Journal of Special Needs Education*. 2005 Feb 1;20:21–40.
35. Geer R, Sweeney T-A. Students' Voices about Learning with Technology. *Journal of Social Sciences*. 2012 Mar 26;8(2):294–303.
36. Looi C-K, Zhang B, Chen W, Seow P, Chia G, Norris C, et al. 1:1 Mobile Inquiry Learning Experience for Primary Science Students--A Study of Learning Effectiveness. *Journal of Computer Assisted Learning*. 2011 Jun;27(3):269–87.
37. Sormunen K, Lavonen J, Juuti K. Overcoming Learning Difficulties with Smartphones in an Inclusive Primary Science Class. *Journal of Education and Learning*. 2019 Mar 29;8:21–34.
38. Hashey AI, Stahl S. Making Online Learning Accessible for Students with Disabilities. *TEACHING Exceptional Children*. 2014;46(5):70–8.
39. Harvey D, Greer D, Basham J, Hu B. From the Student Perspective: Experiences of Middle and High School Students in Online Learning. *American Journal of Distance Education*. 2014 Mar 6;28:14–26.
40. Manzano-León A, Camacho-Lazarraga P, Guerrero MA, Guerrero-Puerta L, Aguilar-Parra JM, Trigueros R, et al. Between Level Up and Game Over: A Systematic Literature Review of Gamification in Education. *Sustainability*. 2021 Jan;13(4):2247.
41. Hunicke R, Leblanc MG, Zubek R. MDA : A Formal Approach to Game Design and Game Research. undefined [Internet]. 2004 [cited 2021 Dec 7]; Available from: <https://www.semanticscholar.org/paper/MDA-%3A-A-Formal-Approach-to-Game-Design-and-Game-Hunicke-Leblanc/2b134e5c46eec50f69c702c0b4aa29687d5d8fba>
42. Post L, Kester L, Admiraal W, Lockhorst D. Gamification in Digitale Oefenprogramma's. :44.
43. Arzone C, Mottan K, md saad K, Pendidikan U, Malim T, Sultan I, et al. The Relationship between Gamification and Emotional Intelligence among Children with Autism Spectrum Disorder. In 2020.
44. Camargo M, Barros R, Brancher J, Barros V, Silva M. Designing Gamified Interventions for Autism Spectrum Disorder: A Systematic Review. In 2019. p. 341–52.
45. Chan JM, Lang R, Rispoli M, O'Reilly M, Sigafos J, Cole H. Use of peer-mediated interventions in the treatment of autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*. 2009;3(4):876–89.
46. Fuchs D, Fuchs LS. Peer-Assisted Learning Strategies: Promoting Word

- Recognition, Fluency, and Reading Comprehension in Young Children. [cited 2021 Dec 7]; Available from: <https://journals.sagepub.com/doi/10.1177/00224669050390010401>
47. Flood WA, Wilder DA, Flood AL, Masuda A. Peer-mediated reinforcement plus prompting as treatment for off-task behavior in children with attention deficit hyperactivity disorder. *J Appl Behav Anal.* 2002;35(2):199–204.
48. Terzieva V. PERSONALISATION IN EDUCATIONAL GAMES – A CASE STUDY. *EDULEARN19 Proceedings.* 2019;
49. Markos K. Gamification in European Education - Methods and Policies [Internet]. [Piraeus]: University of Piraeus; 2021. Available from: [https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/13800/Khattari\\_17015.pdf?sequence=1&isAllowed=y](https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/13800/Khattari_17015.pdf?sequence=1&isAllowed=y)
50. Kessel R van, Hrzic R, O’Nuallain E, Weir E, Wong BLH, Anderson M, et al. Digital Health Paradox: International Policy Perspectives to Address Increased Health Inequalities for People Living With Disabilities. *Journal of Medical Internet Research.* 2022 Feb 22;24(2):e33819.

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