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CHALLENGES OF PERSONALISED EDUCATION FROM PERSPECTIVE OF GENERAL DATA PROTECTION REGULATION

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ABSTRACT

The aim of this research is to find whether the General Data Protection Regulation provides protection to minor students in developing technological learning environments. Since Article 8 GDPR defines age of consent as at least 16 years however not lower than 13 years further implementation is left to the Member States possibly leaving children aged 13 to 15 rather unprotected. This together with parental consent is to be examined in the context of Convention of the Rights of the Child. Furthermore, the general public interest that allows restriction of data subject's rights mentioned in Articles 5, 12-22 and 34 is to be examined in the context of child's best interest.

This research uses qualitative research method and has a subjective approach to the data protection rights due to the exploratory rather than conclusive nature of law. Quantitative research methods could be used when discussing the subject of data, however providing a comprehensive description on statistics of educational data is beyond the scope of this paper and deemed tangential for the legal aim of this research. Primary sources for this research used are EU legislation. Secondary sources include legal articles and reports by international organisations as well as national legislations.

The hypothesis of this thesis is that although General Data Protection Regulation provides special protection to minors the regulation fails to include sufficient protection for educational purposes. Moreover, protection provided by the Regulation could be incoherent with best interest of the child.

Keywords: data protection, personalised education, best interest of the child

INTRODUCTION

Personalised education is gaining popularity as it promises more effective learning outcomes through individualised curriculums that better support child's particular needs. In EU the new General Data Protection Regulation offers wider protection to the data subject and includes regulation on processing of child's data that also applies to educational establishments. However, as collection of data for personalised education with new technologies is a still a somewhat unexplored area of research, conflicts arise when child's right to privacy is balanced against the development of education as well the the rights of the guardian giving consent on the behalf of the child. Moreover, despite acknowledgment of the policy issues raised by data-driven innovation, for example in the report by the OECD that mentions various sectors, legislators have not given specific reference to personalised learning in this context. [1]

This paper provides an overview of the current legislative situation in the context of education and minors as well as the concept of personalised learning with some attention brought on the technological developments in the field. The aim of this paper is to provide guidance in regard to use, storage and sharing of personal data for educational purposes. It provides information on limitations of such data in personalising education for children. The paper inclusively pursues to contribute to the ever-increasing debate on the need for regulation of children's personal data in educational context and the industries that have access to this data. Moreover, it draws attention to the rapid development of technology and how it complies with the regulation.

In this research qualitative research method is used including EU legislation and the CRC General Comments as well as suitable recitals. Published researches and other relevant articles written by legal scholars analysing relevant legislation and development of personalised education are used as secondary sources for this thesis. There is not much case law in regard to the children and the GDPR due legislation being very recent, however, some case law in regard to the rights of the

[1] Reimsbach-Kounatze, C., Van Alsenoy, B. (2013). Exploring Data-Driven Innovation as a New Source of Growth: Mapping the Policy Issues Raised by "Big Data". - OECD Digital Economy Papers, No. 222, 1-28

child from human right perspective and previous data protection legislation The European Data Protection Directive (Directive 95/46/EC) is presented.

Chapter one focuses on introducing concept of personalized learning as well as the EU legislation affording protection to children. General Data Protection Regulation is introduced with attention on provisions covering the rights of the child, providing the reader with overview of the data protection principles and their relation to other relevant legislation. Moreover, special category data and relation of education with the GDPR is briefly covered.

Chapter two discusses rights of the children and the maturity of children in regard to decision making on their data. To that end the age requirement for consent and parental control set by the GDPR is critically examined through the Convention of the Rights of the Child. The relationship of the rights of a student as a data subject with educational establishment as a data processor is discussed in the last sub chapter.

Chapter three discusses child's best interest in data processing. In this chapter further study is conducted on possible security measures offered by schools to students whose personal data is collected, including privacy by design and private databases. Moreover, the chapter covers transfer of personal data on the basis of legitimate interest and economic benefits to the general public provided by the learning analytics.

Expected outcome of this research is that despite providing special protection to children, General Data Protection Regulation fails to encompass developing technologies especially those mentioned in this thesis for the purpose of personalised education. Moreover, protection provided by the Regulation is expected to be at times incoherent with best interest of the child. However as protection of children is a topic seen as priority by EU legislators and personalised education is only a developing field of research determining whether the Regulation provides sufficient protection is difficult.

1. CONCEPT OF PERSONALISED EDUCATION AND RELEVANT LEGISLATION

1.1. Personalisation in learning

Personalised learning is a developing area in education surrounding learning analytics. These technologies are believed to bring possible advancement to curriculums of schools as well as provide customised teaching and support students' learning progress.[2] However the utopic plans for the future of personalised education are yet to face the many legal questions on privacy and data protection in regard with the personal data records of the students that would possibly also be lifelong.[3] Moreover there is a prevailing question on the balance of ensuring quality education for individual and fulfilling objectives and economic interests of the European Union and its Member States.[4]

Personal information can be regarded as any information that relates to a person and identifies them, including physical and digital records.[5] It includes processes and products that consist of personalised content and context, individualised context referring to online spaces that are tailored to one's needs or preferences. Person who's data is being collected is called data subject and is more specifically defined in Article 4(1) of the GDPR.[6] Personalised learning is something educational systems are developing for the future of learning, the idea revolving around combining new digital tools with advanced analytics and cognitive systems in order to create a better learning environment for students as individuals. Personalised education is usually based on algorithms derived from learning analytics surrounding child's learning competence and examination history.[7]

[2] Steiner, C. M., Kickmeier-Rust, M. D., Albert, D. (2016). LEA in private: a privacy and data protection framework for a learning analytics toolbox. - Journal of Learning Analytics, Vol. 3, 66-90
[3] Pardo, A., Siemens, G. (2014). Ethical and privacy principles for learning analytics. -British Journal of Educational Technology, 438–450
[4] *Ibid.* Steiner
[5] Petty, L. (2018). Data Protection in Schools – Guidance for the Education Sector. - High Speed Training, Accessible:
https://www.highspeedtraining.co.uk/hub/data-protection-in-schools/, 12 May 2019
[6] General Data Protection Regulation 2016/679, §4
[7] Kucirkova, N., Ng, I., Holtby, J. (2017). From mirrors to selfies: protecting children's data for personalised learning and future growth. London: University College of London, Institute of Education.

Multiple researches have been done on whether this would also apply to the personalised education and it has been found that learning tools that are based on personal data can substantially improve the student outcomes. Personalised learning includes a broad range of learning programs, different learning experiences, extensive instructional approaches and comprehensive strategies that undertake the diverse interest and aspirations of the students as well as accompanying their weaknesses and taking into account the backgrounds of the students. Experts are wishing to apply the personal students' data to the education of the students for the whole education period starting from elementary to the university continuing to learning in the work lives of the students. These personal data records would hold not only test scores but would also keep data on learning styles and the difficulties the student faces and take influence from other learning modules.[8]

The fast development of new designs and technologies ensures progress in personalised learning and the data-driven cognitive technologies are seen as the key in enabling personalised education and improving the result for not only students but also the educators and administrators. Advanced analytics and data are being used in all different industries in order to provide products and services more suitable for individuals so it seems only natural for the education system to follow the development of such technologies and apply them to the learning methods of pupil as the results of such actions in other industries have been positive. Moreover this development in industries generates more impact at a lower cost. Although educational establishments evidently differ from businesses, a lot can be learned from those industries that already encompass such data collection and have altered their design processes and created safeguards in order to use data productively and ensure the safety of the gathered information. Furthermore much of the safety of the personal student data has to do with the way the data would be collected and used.[9]

1.2. Legislation on data protection and children in European Union

The Universal Declaration of Human Rights (UDHR), ratified in 1948, defined fundamental human rights for the first time.[10] However the first international treaty on human rights was the European Convention on Human Rights (ECHR) adopted in 1950. According to the European

[8] Prinsloo, P., Slade, S. (2016). Student Vulnerability, Agency, and Learning Analytics: An Exploration. - Journal of Learning Analytics, Vol. 3, 159–182
[9] ibid Kucirkova
[10] Geer, J. (2018). The GDPR: An Empowering and Protective Mechanism for Children's Internet Connected Toy Use? (Master's thesis). Tilburg University, Department of Law and Technology. Tilburg.

Court of Human Rights (ECtHR) wording of Article 8 of the Convention on the 'Right to respect for private and family life' covers not only private and family life, home and correspondence but also personal data. Moreover the ECtHR has stated that under certain circumstances Article 8 of the Convention poses positive obligations on the contracting states meaning that the Convention requires states to assertively safeguard the implementation of these rights.[11]

Due to the rapid development of information technologies the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (Convention 108) was adopted in 1981. Applicable to all data processing and individual's rights in regard their personal data the Convention 108 has stayed timely relevant for over 30 years due to its objective approach to technology. However in order to strengthen the implementation of the Convention 108 in 2018 Council of Europe decided to modernise it due to new relevant principles in the field such as transparency, data minimisation and privacy by design also covered by the GDPR[12]. The transition from old version of the Convention 108 to the new one is however complex and it is speculated that the new Convention 108 would come into force in 2023 the earliest.[13]

The Charter of Fundamental Rights of the European Union (CFR) became binding in 2009 when the Treaty of Lisbon came to force. The Charter included Article 24 on the rights of the child regarding children's' freedom of expression and best interest of the child.[14] Moreover CFR not only provided increased protection for private and family life, home and communications through Article 7, it also mentioned separately protection of personal data in Article 8, including right of protection of such data, fair processing, consent, purposefulness and access.[15] The Treaty on the Functioning of the European Union (TFEU) also provided similar protection of personal data in Article 16.

Rights of the child are specifically laid out in the Convention on the Rights of the Child (CRC). Moreover the General Comments of the Committee on the Rights of the Child provide significant

[11] Xenos, Dimitris (2012). The Positive Obligations of the State under the European Convention of Human Rights. Oxfordshire: Routledge.
[12] Schütze, R. (2015). EU Treaties and Legislation. Cambridge: Cambridge University Press.
[13] Svantesson, D. (2016). Enforcing Privacy Between Different Jurisdictions. - Enforcing Privacy: Regulatory, Legal and Technological Approaches, Vol. 25, 195-222
[14] *Ibid.* Schütze
[15] *Ibid.* Geer

information in regard to implementation of these rights.[16] For example CRC General Comment No. 20 on the implementation of the right of the child during adolescence provides guidance on encompassing adolescence development in national legislation with special attention brought on the online environment as a identity builder and a learning tool.[17] Article 28 of the CRC in turn provides the child's right to education whereas Article 29(1) of the CRC specifies that "education of the child shall be directed to:
(a) The development of the child's personality, talents and mental and physical abilities to their fullest potential;". In the light of personalised education, wording of Article 29 CRC seems to suggest that such education should be provided to a child if personalisation is deemed as key element in child's development.

1.3 General Data Protection Regulation provisions on children and education

Adopted in April 2016 by the Council of the European Union the General Data Protection Regulation became applicable in May 2018.[18] The General Data Protection Regulation aims to protect one's privacy and set legal measures on the data subject's control over his or her data including by laying 'principles relating to processing of personal data' in Article 5 and rights of the data subject discussed in Articles 12-23 of the GDPR.[19] The GDPR was preceded by the 'Directive 95/46/EC on the protection of individuals with regard to the processing of personal data' also known as the Data Protection Directive adopted in the 1995.[20] Under the Data Protection Directive conditions for processing personal data were transparency, legitimate purpose, and proportionality, however, with the new General Data Protection Regulation additional principles were introduced in Article 5(1) those being data minimisation, accuracy, limitations on how long the data may be stored in accordance with the purpose for which data is collected and security of the data.

[16] European Union Agency for Fundamental Rights. (2017). Consent to use data on children. Accessible: https://fra.europa.eu/en/publication/2017/mapping-minimum-age-requirements/use-consent 12 May 2019
[17] UN Committee on the Rights of the Child (CRC), General comment No. 20, 6 December 2016, CRC/C/GC/20
[18] European Data Protection Supervisor. (2019). Annual Report 2018. Accessible: https://edps.europa.eu/data-protection_en 12 May 2019
[19] *Ibid.* Petty
[20] Blackmer, W. S. (2016). GDPR: Getting Ready for the New EU General Data Protection Regulation. - Information Law Group, Accessible: https://www.infolawgroup.com/blog/2016/05/articles/gdpr/gdpr-getting-ready-for-the-new-eu-general-data-protection-regulation?rq=gdpr 12 May 2019

Article 8 of the GDPR on 'conditions applicable to child's consent in relation to information society services' is the only Article in the regulation that explicitly considers minors. The article states the age requirement and responsibilities of the data controller in regard to the consent of the child. Due to the wording of articles 12-23 on the rights of the data subject there is no suggestion that these articles would not apply to minors in the same relation as to adults with respect to Article 8.[21] However the application of the GDPR articles considering the data subject must be applied to children in coherence with the provisions of the CRC.[22] Moreover this is ensured by the European Union Agency for Fundamental Rights (FRA) statement "the right to data protection is not an absolute right; it must be balanced against other rights" meaning that application of data protection right should be done bearing in mind
its role in society.[23]

Special category data is information regarding sensitive topics that enjoys greater protection than regular data under the GDPR and processing it requires enhanced safety measures.[24]. Such data is defined in Article 9 GDPR as "racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation". Processing of special category data is prohibited under Article 9(1) of the GDPR yet section 2 of the article provides exceptions from prohibition to process such data.[25]

Educational establishments must consider this when structuring personalised learning based on sensitive data, for example collecting information regarding child's age. Furthermore when processing special category data educators must take into account whether collecting special category data is truly necessary for the specified purposes for which the data subject has given consent as mentioned in Article 9(2). However as mentioned in Article 9(2)(j) of the GDPR educational establishments might process special category data if "processing is necessary for

[21] General Data Protection Regulation 2016/679, § 12-23
[22] Macenaite, M., Kosta, E. (2017). Consent for processing children's personal data in the EU: following in US footsteps? - Information & Communications Technology Law, Vol. 26, No. 2, 146-197
[23] Steiner, C. M., Kickmeier-Rust, M. D., Albert, D. (2016). LEA in private: a privacy and data protection framework for a learning analytics toolbox. - Journal of Learning Analytics, Vol. 3, 66-90
[24] *Ibid.* Petty
[25] General Data Protection Regulation 2016/679, § 9

archiving purposes in the public interest, scientific or historical research purposes or statistical purposes in accordance with Article 89(1) based on Union or Member State law which shall be proportionate to the aim pursued, respect the essence of the right to data protection and provide for suitable and specific measures to safeguard the fundamental rights and the interests of the data subject".[26]

Taking into account CRC General Comment No. 1 on education aiming to "the holistic development of the full potential of the child" as well as "teaching methods should be tailored to the different needs of different children"[27] personalised education provides educators with vast amount of new information regarding child's development that could be beneficial for educational structures globally. However sharing such delicate information even for public interest and scientific purposes is controversial not only with General Data Protection Regulation but also with the rights of the child of the Convention on the Rights of the Child. Moreover the meaning of ensuring sufficient safeguards for collecting children's data as mentioned in Articles 89 and 25(2) of the GDPR remains relatively vague even with 'Recital 78- Appropriate technical and organisational measures'. Although the recital names possible internal policies that would comply as appropriate technical and organisational measures, it fails to do so in exhaustive manner and include specific technical solutions, leaving technicians and educators with possibility of error and data breach.[28]

[26] General Data Protection Regulation 2016/679, § 89
[27] UN Committee on the Rights of the Child (CRC), General comment No. 1, 17 April 2001, CRC/C/GC/20
[28] General Data Protection Regulation 2016/679, Recital 78

2. CONDITIONS APPLICABLE TO CHILD'S CONSENT

2.1. Age requirement for consent

Educational analytics and data should take into account the consent of the student in accordance with Articles 4(11) and 7 of the GDPR. Article 4(11) of the GDPR defines consent as "any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her;".[29] In order for consent to be lawful basis for processing, the data controller has to meet conditions for consent set in Article 7, including presenting the request for consent for the data subject in clear and plain language as mentioned in section 2.[30] This condition, however, proves to be difficult to apply to children as they may not be fully aware of the consequences that processing personal data imposes. As Chief Operating Officer Dr Xiao Ma, of data account solution provider HAT Community Foundation, puts it, children under 16 should not be expected to understand risks and safeguards that follow obtaining personal information.[31]

New principles introduced by the GDPR provide users with further empowerment over their personal data.[32] However experts such as Janice Richardson, expert on children's rights to the Council of Europe, and Joseph Savirimuthu, Senior Lecturer in Law at the University of Liverpool, debate that the Regulation does not genuinely consider the rights of the children by denying their right to consent to the use of their data by the information society service providers if they are under 16 years old. Instead the responsibility to consent is given to child' holder of parental responsibility, possibly infringing child's right to privacy as mentioned in the CRC.[33] Article 8 of the Regulation regarding the consent of the child to process his or her personal data, defines age of consent as at least 16 years however not lower than 13 years. As further implementation is left to the Member States, there is danger that children aged 13 to 15 are left unprotected.[34] Moreover the risk of this is increased as minimum age requirement for consent to the use of child's data

[29] General Data Protection Regulation 2016/679, Definitions
[30] General Data Protection Regulation 2016/679, § 4, 7
[31] *Ibid.* Kucirkova
[32] *Ibid.* Geer
[33] Savirimuthu, J. (2016). EU General Data Protection Regulation Article 8: Has Anyone Consulted the Kids?. LSE Media Policy Project, Accessible: https://blogs.lse.ac.uk/mediapolicyproject/2016/03/01/eu-general-data-protection-regulation-article-8-has-anyone-consulted-the-kids/ 12 May 2019
[34] European Union Agency for Fundamental Rights. (2017). Consent to use data on children. Accessible: https://fra.europa.eu/en/publication/2017/mapping-minimum-age-requirements/use-consent 12 May 2019

differs widely between the Member States.[35] For example Estonian Personal Data Protection Act states that minimum age allowed for processing child's personal data with his or her consent is 13 years[36], whereas Germany's derogation from mentioning children in the Federal Data Protection Act, sets the age for consent as 16 years. The implementation of Article 8 among the Member States is not only inconsistent in their final adoption of the age of consent, but also includes multiple revisions by the Members States, demonstrating the uncertainty that derives from lack of unified age requirement.

In Czech Republic the first draft on the processing of personal data set the age of consent as 13 years, however the revised draft increased the age to 15 years. Similar turn of events occurred in Ireland where children's age of consent was increased from 13 to 16 years. On the other hand in Finland the age for consent was lowered in the Act on Data Protection (1050/2018) from the originally suggested 15 years to 13 years. Multiple businesses, such as AmCham Croatia and Google, and international organisations, including UNICEF, have advocated the age of 13 for consent, arguing that setting a higher age for consent could harm teenagers wellbeing by reducing their social interaction and educational opportunities. Moreover according to Google, 1998 US Children's Online Privacy Protection Act (COPPA) and Article 17 of the CRC "children are entitled to information that is important to their health and well-being", 13 years as the age limit for consent is advised.[37]

Determining child's legal competence through physical age alone proves intricate as each child's maturity differs not only by individual psychological development but also through interpretations of a child in different societies and cultures.[38] Milda Macenaite, a PhD Researcher at Tilburg Institute for Law, Technology, and Society, claims that trying to determine child's legal capacity through age often leads to inconsistent and synthetic legal frameworks. In her article 'From universal towards child-specific protection of the right to privacy online: Dilemmas in the EU General Data Protection Regulation', Macenaite argues that restriction on consent of the children

[35] Centre for Information Policy Leadership. (2018). GDPR Implementation In Respect of Children's Data and Consent. Accessible: https://privacy.huntonwilliamsblogs.com/wp-content/uploads/sites/18/2018/03/CIPL-White-Paper_GDPR-Implementation-in-Respect-of-Childrens-Data-and-Consent.pdf 12 May 2019
[36] Isikuandmete kaitse seadus. RT I, 30.12.2010, 11
[37] Milkaite, I., Lievens, E. (2019). The changing patchwork of the child's age of consent for data processing across the EU. - Better Internet for Kids, Accessible: https://www.betterinternetforkids.eu/web/portal/practice/awareness/detail?articleId=3017751 12 May 2019
[38] *Ibid.* Macenaite

provided by the GDPR fails to consider best interest of the child[39] thus infringing Article 3 (1) of the CRC where primary consideration in regard to children must be their well being.[40] Furthermore, CRC Article 12(1) supports the view that age alone cannot determine child's legal capacity, stating that child should be allowed to freely express his or her views "in accordance with their age and maturity". The wording of the article seems to suggest that maturity should be considered in decision making as much as the physical age of the child. Additionally it is indicated by scholars how the GDPR derogates responsibility over possible contradictions arising from Article 8 to the Member States "with no guiding principles but ad hoc reasons framed as policy".[41]

2.2. Conflict between parental consent and the rights of the child

As the collection of data would start from a young age, the consent for the collection of student data would have to come from the parent in accordance with Article 8 of the GDPR. Although parental controls in personalised education are seen as beneficial in minimising risks related to processing of children's personal data, the rights of the parents are in evident controversy with child's right to privacy. Due to evolving capacities of children, parental controls are more easily justifiable for younger children, whereas control over adolescents seems to require individual assessment as age alone does not necessarily correlate to child's maturity and capacity to understand consequences of consent.[42] Furthermore it is not always clear that a legal guardian represents the best interest of the child in accordance with Article 3 (1) of the CRC. [43]

Article 14(2) of the CRC assures that a parent or legal guardian has the right to supervise the child, however needs to acknowledge child's developing capacities while doing so. This is the underlying principle recognised in the CRC, where the guardian's control over child should not surpass child's evolving understanding of matters regarding himself or herself.[44] General Data Protection Regulation however challenges this interpretation, by setting parental responsibility over child up to the age of 16.[45] Not only does the age requirement by the GDPR raise questions on the child's

[39] Macenaite, M. (2017). From universal towards child-specific protection of the right to privacy online: Dilemmas in the EU General Data Protection Regulation. -*New Media Society*, Vol. 19, No. 5, 765-779
[40] *Ibid.* Savirimuthu
[41] *Ibid.* Savirimuthu
[42] Stalford, H. (2015).Journeys to European Justice: (How) Can the EU Enable Children to Enforce their Rights?. -*The EU as a Children's Rights Actor: Law, Policy and Structural Dimensions*, 19-48.
[43] *Ibid.* Savirimuthu
[44] *Ibid.* Savirimuthu
[45] General Data Protection Regulation 2016/679, § 8

privacy, but also practical questions in regard to child's right to withdrawal of consent as well as right of erasure. Moreover, if in accordance to Article 8 only guardian's consent is needed, does the ISS provider have the obligation to provide information in relation to data processing in a language comprehensible by a child?[46]

There is a possibility that the guardian of the minor will not allow the collection of student data which would lead to multiple organisational problems within the educational establishment. If not giving consent to collection of personal data would deny the student from accessing the virtual learning environment it could cause the division of classrooms and separation of those who receive personalised education and those whose data is not collected. This in turn would most likely lead to different learning outcomes and potentially jeopardise the future of those students who do not receive personalised education,[47] possibly violating Article 29(1) of the CRC according to which education should guarantee child's development to the fullest. Moreover in accordance with Article 1 of the Convention Against Discrimination in Education, depriving a child from access to any kind of education is prohibited. The wording does not suggest exclusion of personalised education from the scope of Article 1, thus creating a contradiction with parental control.[48]

Considering above mentioned, Article 26(3) of the UDHR states that "parents have a prior right to choose the kind of education that shall be given to their children". While guardian of the child is expected to act with child's best interest in mind as CRC Article 18(1) states, in context of personalised education child's best interest in accordance with Article 3 (1) of the CRC, would be to receive the best education available. Moreover promising outcomes of personalised education through learning analytics follow the guidelines set in Article 13 of the International Covenant on Economic, Social and Cultural Rights (ICESCR) urging school systems to actively develop. If personalisation in education proves to result in better learning outcomes while ensuring appropriate safeguards, guardians would not seem have the right to withdraw consent to collection of child's personal data by educational establishments, based on Article 3(1) of the CRC.[49]

[46] Carr. J. (2017). Questions about the GDPR. *Desiderata*, Accessible: https://johnc1912.wordpress.com/2017/11/30/questions-about-the-gdpr/ 12 May 2019
[47] *Ibid.* Geer
[48] Convention Against Discrimination in Education, §1
[49] *Ibid.* Prinsloo

2.3 Rights of the data subject with respect to personalised education

Data subject's right are recited in Articles 12-23 of the GDPR. These Articles apply to all individuals, children alike as the wording of these Articles does state differently.[50] For the purpose of this research right to be informed and profiling are covered in this chapter trough examination on whether they imperil best interest of the child in regard to personalised education.

Articles 12, 13, 14 and 19 of the Regulation include obligations of data collector toward the data subject as information provider of the collected data.[51] In accordance with these articles student's have the right to receive information regarding the data collected about them with reference to principle of transparency in processing of personal data.[52] Additionally, detailed requirements towards the data collectors responsibility to provide information on collected personal information are listed in Article 13 of the Regulation.[53] As the information is forwarded to a child, the information needs to be presented in a clear and precise manner ensuring that the child understands the information provided to him or her, with emphasis by schools on drafting detailed privacy notices.[54]

However, if the consent to collection of child's data is received from the guardian, the Regulation leaves it ambiguous if the schools are obligated to present information in a language comprehensible by a child, as such circumstances are not specified in the provisions.[55] Furthermore it is unclear whether the educators are obligated to provide all information on learning analytics to the students or may withhold some information if the student is deemed to perform better without the specific information about his or her data. For example, if the student is at risk to fail, do the data collectors have an obligation to share this data with the student despite it possibly having a negative impact on the his or her performance. Such conduct by educational establishment might demotivate the students by labelling them as failures and affect their learning outcomes.[56] Aforesaid situations should be examined through Article 3(1) of the CRC, with main objective being the best interest of the child.

[50] General Data Protection Regulation 2016/679, § 12-23
[51] General Data Protection Regulation 2016/679, § 12-14, 19
[52] General Data Protection Regulation 2016/679, Recital 39
[53] General Data Protection Regulation 2016/679, § 13
[54] *Ibid.* Information Commissioner's Office
[55] I*bid.* Carr
[56] *Ibid.* Kucirkova

On the other hand, as situations where consent comes from the parent are not specified in the GDPR, the educators might have the right to the provide data to the parents instead of the child, thus eliminating the risk of negative impact on the child. Nevertheless, as these are only potential failures, the data collectors should opt to share the information instead of withholding it and possibly infringing the data protection principle of transparency.[57] As, however, applying principles of the GDPR to child's education might violate principles of the CRC, legislators should re-examine Articles 8 of the GDPR in exhaustive manner and possibly approach the aforementioned controversy by specifying data collectors obligation to provide information to a child where the consent has been received from the legal guardian in Article 13 of the Regulation. Right of access, as well as rectification and erasure of the child's data by the child's request if the consent for the collection of data comes from the legal guardian of the child, should also be revised in similar way due to Regulation's lacking guidance on the matter.[58]

Further controversy on the rights of the student as a data subject arise from profiling of the child's data as there is no explicit conduct on this under provisions of the GDPR.[59] Under the GDPR profiling is defined as "any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular to analyse or predict aspects concerning that natural person's performance at work, economic situation, health, personal preferences, interests, reliability, behaviour, location or movements".[60] Recital 71 on Article 22 of the GDPR determines that profiling "should not concern a child". Repugnant to Recital 71, Article 29 Working Party Guidance, endorsed by the European Data Protection Board, states that children's profiling is allowed by data controllers, if the profiling does not have a "legal or similarly significant effect".[61]

In personalised education profiling is inevitable due to the nature of learning analytics with purpose to provide individualised education based on each data subject's development, thus making the data unidentifiable to a person through pseudonymisation and anonymisation would

[57] Chui, M., Sarakatsannis, J. (2015). Protecting student data in a digital world. - McKinsey & Company, Accessible:https://www.mckinsey.com/industries/public-sector/our-insights/protecting-student-data-in-a-digital-world 12 May 2019
[58] *Ibid.* Carr
[59] *Ibid.* Geer
[60] General Data Protection Regulation 2016/679, § 4
[61] *Ibid.* Carr

contradict its purpose. Although it would seem that educational establishment should avoid profiling in regard to children, Information Commissioner's Office (ICO) confirms Article 29 Working Party Guidance by stating that Recital 71 cannot be held as an absolute prohibition, as such is not mentioned in the Articles of the GDPR itself and should be rather perceived as guidance on avoiding profiling of children's data.[62] As learning analytics controlled by educational establishment do not collect data for marketing purposes ipso facto, in accordance with WP29 personalised education does not fall within category having "legal or similarly significant effect", thus allowing profiling of the students.[63] However statements of WP29 and ICO further emphasise inconsistency within the GDPR and calls for definition in the wording of Recital 71, if profiling of children is allowed under the GDPR, as long as the profiling does not have "legal or similarly significant effect".[64]

[62] *Ibid.* Information Commissioner's Office
[63] Article 29 Data Protection Working Party, Guidelines On Automated Individual Decision-making And Profiling For The Purposes Of Regulation 2016/679, p 28
[64] *Ibid.* Carr

3. PROTECTION OF CHILD'S BEST INTERESTS IN PROCESSI NG OF PERSONAL DATA

3.1 Ensuring child's right to privacy in personalised education

The right to privacy is an international human right under the UDHR. Child's right to privacy is more specifically mentioned in Article 16 of the CRC according to which " no child shall be subjected to arbitrary or unlawful interference with his or her privacy… the child has the right to the protection of the law against such interference or attacks." Although the right to privacy is enjoyed by adults and children to the same extent, when applying child's right to privacy it is clear that children enjoy different amount of protection due to principle of child's best interest.[65] Despite an overlap between the CRC right to privacy and data protection afforded by the GDPR this research acknowledges the differences between the two rights while referring to them in the following chapters.

As mentioned previously in chapters 2.1 and 2.2, child's privacy is possibly contravened by age restriction on consent set by Article 8 of the GDPR. However, child's right to privacy encounters further risk of breach during processing of the data. For example, when processing data the principles of the GDPR must be followed including the principle of storage limitation, meaning that the identifiable data should be deleted after it has served its purpose.[66] This principle however proves difficult to assess in context on personalised education as it is not evident whether the educational establishments should keep the data for the student's whole education process. Moreover, purpose limitation proves difficult if the student is to receive education in different schools through time. It is not given that the educational establishment should exchange learning data of the student as they fall at risk of breaching the data protections principles as well as child's privacy.[67]

[65] Schuurman, M. (2015). Developing a model for Mainstreaming Children's Rights into EU Law and Policy-making. - The EU as a Children's Rights Actor: Law, Policy and Structural Dimensions, 49-76.
[66] General Data Protection Regulation 2016/679, § 5 e
[67] Lind-Haldorsson, O., O'Donell, R. (2015). The EU and Child Protection Systems: The Role and the IMpact of the EU in Advancing Children's Protection Rights. - The EU as a Children's Rights Actor: Law, Policy and Structural Dimensions, 101-132.

In relation to personalised learning, GDPR does not exhaustively define data owner. Whereas usually the owner of the data collection instrument is regarded as the owner of the data, in some instances data subject is viewed to lend the data about him or her to the data processor within the purpose limitation.[68] However in circumstances where the educational establishments use the data received from the students to create prediction models for learning, data ownership becomes unclear in regard to who is the owner of the originally obtained data from the student and the information derived from that data.[69] Moreover if the data is being integrated in order to obtain more detailed data, for example the data of student's background is integrated with learning analytics, the ownership of the data is more intricate.[70] Yet due to the flowing nature of data with no set threshold legal scholars believe that it cannot be owned.[71] In response to the controversy over data ownership it has been proposed that students should be regarded to share responsibility over accuracy and up-keeping of their data together with schools.[72] Such conduct would however evoke once again controversy on whether a child is allowed to control his or her data by one's own will if the consent to data collection has come from the parent.[73]

Securing the data is the key element in ensuring fulfilment of child's right to privacy in personalised education. Security is one of the principles of data processing mentioned in Article 5 of the GDPR as well as Article 32 that obligates data controllers and processors to "implement appropriate technical and organisational measures to ensure a level of security appropriate to the risk".[74] However, as mentioned by data protection specialist Frederick Leentfar privacy cannot be secured only through legislation, but should be interpreted as a core principle in the design of information society services.[75] For this reason Article 25 of the GDPR on data protection by design and default was introduced. In its content the article is similar to Article 32 requiring technical and organisational measures in designs of data processing that actively implement principles of data protection. Despite this, with no further guidance on specific processing situations educational

[68] *Ibid.* Steiner
[69] Kay, D., Korn, N., Oppenheim, C. (2012). Legal, Risk and Ethical Aspects of Analytics in Higher Education. - Cetis LLP publications, No 6, 1-30
[70] *Ibid.* Steiner
[71] Tene, O., Polonetsky, J. (2013). Big data for all: Privacy and user control in the age of analytics.- Northwestern Journal of Technology and Intellectual Property, 239–273
[72] *Ibid.* Prinsloo
[73] Buitelaar, J. C. (2018). Child's best interest and informational self-determination: what the GDPR can learn from children's rights International Data Privacy Law, Volume 8, Issue 4, 293–308.
[74] General Data Protection Regulation 2016/679, § 32
[75] Leentfaar, F. (2016). Privacy by design and default. Taylor Wessing Global Data Hub, Accessible:https://www.taylorwessing.com/globaldatahub/article-privacy-by-design-and-default.html 12 May 2019

establishments are faced with the challenge on designing effective technological solutions for harnessing learning analytics while complying with all data protection principles such as data minimisation and accuracy.[76] Some schools have opted for adopting private data accounts such as HAT PMDAs for collection of student data as students' legal ownership of their data reduces equivocation, as portrayed by landmark case on database owners *Beechwood House Publishing (t/a Binleys) v Guardian Products Limited & another* [2011].[77] Importantly such private databases enable ownership as they can be treated as property unlike data itself, resolving the problem of uncertainty of data ownership. Moreover these databases exempt educators from storage of data thus transferring obligations set by the Article 15 of the GDPR.[78]

To that end wording of Article 32 with respect to 'appropriate technical and organisational measures' and 'appropriate to the risk' could benefit from detailed explanation from the European Data Protection Board the former WP29, due to its vagueness. Similarly it is advised to reassess article's wording 'state of the art' as scholars believe it does not stand well the test of time due to rapid development of technology possibly falling outside the scope of the Article due to this.[79] Furthermore it should be noted by educational establishment that possible contradictions between GDPR and the CRC, might lead to infringement of the rights of the child despite technical organisational designs complying with the data protection principles. To that end legal scholars suggest directing principles of the GDPR to adopt values of the CRC trough guidelines and design solutions.[80]

3.2 Balancing interest for educational data

[76] Pardo, A., Siemens, G. (2014). Ethical and privacy principles for learning analytics. -British Journal of Educational Technology, 438–450
[77] Levine, S., Beloff, C. (2011). Landmark ruling for database owners in relation to 'seeding' and 'substantial part. - DLA Piper, Accessible: https://www.remarksblog.com/2011/08/landmark-ruling-for-database-owners-in-relation-to-seeding-and-substantial-part/ 12 May 2019
[78] *Ibid.* Kucirkova
[79] EclecticIQ. (2017). GDPR and 'State of the Art' Security. Medium, Accessible: https://medium.com/@eclecticiq/gdpr-and-state-of-the-art-security-a5c07c04aeeb 12 May 2019
[80] Savirimuthu, J. (2019). Datafication as parenthesis: reconceptualising the best interests of the child principle in data protection law. International Review of Law, Computers & Technology, 1-32

Developing technologies create new possibilities but also new challenges in respect to safety of personal information. Moreover due to digitalisation it has become unclear what information can be regarded as strictly personal and what of public property.[81] In context of development of big data, article by Tene and Polonetsky (2013) emphasises how principle of data minimisation and control of individual should not be applied in a strict manner. Instead in their article Tene and Polonetsky argue that while it is important to highlight principles of transparency, access and accuracy, the data should also take into account data's output to society.[82] However in context of special protection afforded by children outsourcing personal data to third parties is questionable despite possible benefit to the society.[83]

Information gathered from learning analytics potentially provides not only innovational but also economic benefit to the society, yet it is not clear whether utilising children's data for such purposes would violate data protection principles and children's fundamental rights to privacy.[84] As the valuable data of personalised education could, however prompt innovation and create economic opportunities, utilising these opportunities would be in line with European Commission's position on personal data that encourages flexible data protection as long as it does not threaten fundamental rights of an individual.[85] While there is a growing trend on empowering and investing in children as prominent figures that actively participate in area of social and economic life[86] their fundamental rights may not be neglected.[87] Moreover the raising protection of children's rights in EU legislation, including symbiosis of EU Strategy and the Agenda for the Rights of the Child with the Commission's Growth Strategy, Europe 2020 showcases how legislators' recognise the longstanding benefits derived from investing in children.[88]

Demands for advanced education create multiple opportunities, business not excluded. The Commission estimates that by the year 2028 the digital content market will reach 113 billion

[81] Bartoli, E. (2019). Children's data protection vs marketing companies. - Information Technology and Traditional Legal Concepts, 35-46
[82] *Ibid.* Tene
[83] *Ibid.* Bartoli
[84] *Ibid.* Savirimuthu
[85] Commission 2012a
[86] Commission 2011, The EU Agenda for the Rights of the Child
[87] Piper, C. (2011). Investing in a Child's Future: Too Risky?. - Child and Family Law Quarterly, Vol. 22, No. 1, 1-20
[88] *Ibid.* Savirimuthu

Euros.[89] It is further estimated that personalised education could bring up to 1.2 trillion Dollars in global economic value.[90] The challenge in creating a legal framework that would encompass relevant safeguards while allowing growing economic potential has been in discussion for a long time. The topic was already explored in 2010 the World Economic Forum where main conclusion revolved around adaptable and flexible data protection legislation. With new technologies allowing easier access of businesses to the data of individuals, balancing protection of fundamental rights with reaching EU's goals on internal market and free flow of data is evermore significant.[91] To that end as pointed out by the Commission with speedy development of technologies utilised by children, the demand for online education is constantly growing.[92]

With increasing demand by businesses to utilise children's educational data it is evermore pivotal to accentuate imbalance between data subjects and data processors[93] as according to the recital 43 of the GDPR imbalance of power leads to invalidity of consent as consent is considered not freely given in such situation.[94] The question of imbalance is also present when examining processing based on 'legitimate interest' of the data controller. Under the Regulation Article 6(1)(f) data controllers are allowed to utilise profiling if "processing is necessary for the purposes of the legitimate interests pursued by the controller or by a third party, except where such interests are overridden by the interests or fundamental rights and freedoms of the data subject which require protection of personal data, in particular where the data subject is a child". With fundamental rights requirement, personalised education faces once again the uncertainty of balancing the benefits of sharing learning analytics for innovation and global economy with child's right to privacy.[95] Moreover scholars warn how the lack of definition on 'profiling' in the Article 6 possibly leads to imbalance of power between data processor and the child.[96]

[89] Commission 2012a
[90] *Ibid.* Chui
[91] Commission 2010b
[92] Commission 2012a
[93] *Ibid.* Savirimuthu
[94] General Data Protection Regulation 2016/679, Recital 43
[95] General Data Protection Regulation 2016/679, § 6
[96] *Ibid.* Savirimuthu

CONCLUSION

Going back to the aim stated at the beginning of this thesis, it has been examined whether the General Data Protection Regulation provides protection to minor students in developing technological learning environments and is coherent with best interest of the child. The GDPR acknowledges child's enjoyment of enhanced protection and imposes regulation on processing of data specifically in relation to children. Moreover the fundamental rights of the child are covered in the Regulation in regard to principles of the GDPR. However best interest of the child is not necessarily present with age requirement of consent and parental control. The parental consent also proves difficult to apply in situations where the data subject would enjoy the right of access, rectification and erasure as the GDPR fails to include aforementioned situations.

The main goal of personalised education is for students and the society to benefit from the process without compromising the safety of the students. The benefits of personalised education should therefore outweigh the negative impacts that collecting child's personal information could possibly cause. Furthermore, the interest of the educational systems and the general public should be balanced against the fundamental rights of the child with child's best interest in mind.

Educational establishments should have individual maximum protected databases to ensure the safety of the data and compliance with the GDPR. To that end, educational establishments should receive consent to processing of child's data from the legal guardian in accordance with Article 8 GDPR. Irregardless of unclarity with parental consent in the GDPR, schools should opt for transparency with the child whose data is processed minimising the risk of infringing not only provisions of the GDPR but also the CRC. The collection of personalised education data should be done with causing minimal risk to the individual.

However, obtaining consent is not needed if the processing is necessary due to 'legitimate interest'. This principle proves difficult in regard to personalised education as the fundamental rights of the child contradict with the possibilities learning analytics create in public domain of innovation and global economy. Neither does the GDPR, CRC nor the does the European Commission define whether the child's fundamental rights should be advocated over the interest of the general public, leaving the situations to individual assessment. With personalised education possibly transforming global educational structure ensuring the balance of the rights of the child with EU strategies would be advised trough legal measures. In order to tackle the concerns over personalised education the

decision makers should understand the developing technologies better and address them accordingly.

This thesis suggest that vague and unclear concepts introduced by the GDPR for data controllers and data subjects should be specified. Especially regulation on data processing should ensure enabling research while protect the data subjects. This is pivotal for the development of research in the field personalised education and ensuring best interest of the child. To this extent learning analytics and their application should be specified in detail and introduced in regulation on data protection and recognised by the Union as a scientific ambition, allowing development of new technologies and research methods.

Both suggestions are however complicated to implement due to possible infringement of fundamental rights of the child. While the child's best interest should be a priority in decision making it should be examined not only from immediate effect but also long term. Integration of child's right, especially in context of privacy and public interest, should not be left to the implementation of Member States but embodied by various legislations.

LIST OF REFERENCES

Scientific books

1. Breen. C. (2006). Age Discrimination and Children's Rights: Ensuring Equality and Acknowledging Differences. Leiden: Koninklijke Brill NV.

2. Schütze, R. (2015). EU Treaties and Legislation. Cambridge: Cambridge University Press.

3. Xenos, Dimitris (2012). The Positive Obligations of the State under the European Convention of Human Rights. Oxfordshire: Routledge.

4. Handbook on European data protection law. (2014). Luxembourg: Publications Office of the European Union.

Scientific articles

5. Bartoli, E. (2019). Children's data protection vs marketing companies. - *Information Technology and Traditional Legal Concepts*, 35-46.

6. Buitelaar, J. C. (2018). Child's best interest and informational self-determination: what the GDPR can learn from children's rights. - *International Data Privacy Law*, Volume 8, Issue 4, 293–308.

7. Flint, D. (2019). Law shaping technology: Technology shaping the law. - *Information Technology and Traditional Legal Concepts*, 5-12.

8. Kay, D., Korn, N., Oppenheim, C. (2012). Legal, Risk and Ethical Aspects of Analytics in Higher Education. - *Cetis LLP publications*, No 6, 1-30.

9. Kucirkova, N., Ng, I., Holtby, J. (2017). From mirrors to selfies: protecting children's data for personalised learning and future growth. London: University College of London, Institute of Education.

10. Lind-Haldorsson, O., O'Donell, R. (2015). The EU and Child Protection Systems: The Role and the Impact of the EU in Advancing Children's Protection Rights. - *The EU as a Children's Rights Actor: Law, Policy and Structural Dimensions*, 101-132.

11. Macenaite, M. (2017). From universal towards child-specific protection of the right to privacy online: Dilemmas in the EU General Data Protection Regulation. -*New Media Society*, Vol. 19, No. 5, 765-779.

12. Macenaite, M., Kosta, E. (2017). Consent for processing children's personal data in the EU: following in US footsteps?. - *Information & Communications Technology Law*, Vol. 26, No. 2, 146-197.

13. Pardo, A., Siemens, G. (2014). Ethical and privacy principles for learning analytics. - *British Journal of Educational Technology*, 438–450.

14. Piper, C. (2011). Investing in a Child's Future: Too Risky?. - *Child and Family Law Quarterly*, Vol. 22, No. 1, 1-20.

15. Prinsloo, P., Slade, S. (2016). Student Vulnerability, Agency, and Learning Analytics: An Exploration. - *Journal of Learning Analytics*, Vol. 3, 159–182.

16. Reimsbach-Kounatze, C., Van Alsenoy, B. (2013). Exploring Data-Driven Innovation as a New Source of Growth: Mapping the Policy Issues Raised by "Big Data". - *OECD Digital Economy Papers*, No. 222, 1-28.

17. Savirimuthu, J. (2015). Networked Children, Commercial Profiling and the EU Data Protection Reform Agenda: In the Child's Best Interests?. - *The EU as a Children's Rights Actor: Law, Policy and Structural Dimensions*. 221-257.

18. Savirimuthu, J. (2019). Datafication as parenthesis: reconceptualising the best interests of the child principle in data protection law. - *International Review of Law, Computers & Technology*, 1-32.

19. Schuurman, M. (2015). Developing a model for Mainstreaming Children's Rights into EU Law and Policy-making. - *The EU as a Children's Rights Actor: Law, Policy and Structural Dimensions*, 49-76.

20. Stalford, H. (2015).Journeys to European Justice: (How) Can the EU Enable Children to Enforce their Rights?. - *The EU as a Children's Rights Actor: Law, Policy and Structural Dimensions*, 19-48.

21. Steiner, C. M., Kickmeier-Rust, M. D., Albert, D. (2016). LEA in private: a privacy and data protection framework for a learning analytics toolbox. - *Journal of Learning Analytics*, Vol. 3, 66-90.

22. Svantesson, D. (2016). Enforcing Privacy Between Different Jurisdictions. - *Enforcing Privacy: Regulatory, Legal and Technological Approaches*, Vol. 25, 195-222.

23. Tene, O., Polonetsky, J. (2013). Big data for all: Privacy and user control in the age of analytics.- *Northwestern Journal of Technology and Intellectual Property*, 239–273.

EU and international legislation

24. European Parliament and Council of the European Union, General Data Protection Regulation (EU) 2016/679, 27 April 2016, OJ L 119, 4.5.2016, art 4, 5, 7-9, 12-23, 25, 32.

25. UN General Assembly, Convention on the Rights of the Child, 20 November 1989, United Nations, Treaty Series, art 3, 12, 14, 28, 29

26. UN General Assembly, International Covenant on Economic, Social and Cultural Rights, 16 December 1966, United Nations, art 13

27. UN Educational, Scientific and Cultural Organisation, Convention against Discrimination in Education, 14 December 1960, art 1

28. UN General Assembly, Universal Declaration of Human Rights, 10 December 1948, art 26

Other countries' legislation

29. Bundesdatenschutzgesetz vom 30. Juni 2017 (BGBl. I S. 2097)

30. Children's Online Privacy Protection Act of 1998, 15 U.S.C. 6501–6505

31. Isikuandmete kaitse seadus. RT I, 30.12.2010, 11

32. Tietosuojalaki 1050/2018

Other court decisions

33. EWPCC 8 PAT 09011

Other sources

34. Article 29 Data Protection Working Party. (2016) Guidelines On Automated Individual Decision-making And Profiling For The Purposes Of Regulation 2016/679, p 28.

35. Blackmer, W. S. (2016). GDPR: Getting Ready for the New EU General Data Protection Regulation. - *Information Law Group*, Accessible: https://www.infolawgroup.com/blog/2016/05/articles/gdpr/gdpr-getting-ready-for-the-new-eu-general-data-protection-regulation?rq=gdpr 12 May 2019.

36. Carr. J. (2017). Questions about the GDPR. - *Desiderata*, Accessible: https://johnc1912.wordpress.com/2017/11/30/questions-about-the-gdpr/ 12 May 2019

37. Centre for Information Policy Leadership. (2018). GDPR Implementation In Respect of Children's Data and Consent. Accessible: https://privacy.huntonwilliamsblogs.com/wp-content/uploads/sites/18/2018/03/CIPL-White-Paper_GDPR-Implementation-in-Respect-of-Childrens-Data-and-Consent.pdf 12 May 2019

38. Chui, M., Sarakatsannis, J. (2015). Protecting student data in a digital world. - *McKinsey & Company*, Accessible:https://www.mckinsey.com/industries/public-sector/our-insights/protecting-student-data-in-a-digital-world 12 May 2019

39. EclecticIQ. (2017). GDPR and 'State of the Art' Security. - *Medium*, Accessible: https://medium.com/@eclecticiq/gdpr-and-state-of-the-art-security-a5c07c04aeeb 12 May 2019

40. European Commission. (2010). *Effective levels of company taxation within an enlarged EU*.

41. European Commission. (2011). *Annual growth survey: advancing the EU's comprehensive response to the crisis*.

42. European Commission. (2011). *The EU Agenda for the Rights of the Child.*

43. European Commission. (2012). *The social impact of the economic crisis and ongoing fiscal consolidation.*

44. European Data Protection Supervisor. (2019). Annual Report 2018. Accessible: https://edps.europa.eu/data-protection_en 12 May 2019

45. European Parliament and Council of the European Union, General Data Protection Regulation (EU) 2016/679, Recital 39, 43, 78

46. European Union Agency for Fundamental Rights. (2017). Consent to use data on children. Accesible: https://fra.europa.eu/en/publication/2017/mapping-minimum-age-requirements/use-consent 12 May 2019

47. Geer, J. (2018). The GDPR: An Empowering and Protective Mechanism for Children's Internet Connected Toy Use? (Master's thesis). Tilburg University, Department of Law and Technology. Tilburg.

48. Information Commissioner's Office. Children and the GDPR, What if we want to profile children or make automated decisions about them?, Accessible: https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/children-and-the-gdpr/what-if-we-want-to-profile-children-or-make-automated-decisions-about-them/ 12 May 2019

49. Information Commissioner's Office. (2019). Outsourcing Oversight? The case for reforming access to information law. Report of the Information Commissioner to Parliament, Accessible: https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr/applications/children/ 12 May 2019

50. Leentfaar, F. (2016). Privacy by design and default. - *Taylor Wessing Global Data Hub*, Accessible:https://www.taylorwessing.com/globaldatahub/article-privacy-by-design-and-default.html 12 May 2019

51. Levine, S., Beloff, C. (2011). Landmark ruling for database owners in relation to 'seeding' and 'substantial part. - *DLA Piper*, Accessible: https://www.remarksblog.com/2011/08/landmark-ruling-for-database-owners-in-relation-to-seeding-and-substantial-part/ 12 May 2019

52. Milkaite, I., Lievens, E. (2019). The changing patchwork of the child's age of consent for data processing across the EU. - *Better Internet for Kids, Accessible*: https://www.betterinternetforkids.eu/web/portal/practice/awareness/detail?articleId=3017751 12 May 2019

53. Petty, L. (2018). Data Protection in Schools – Guidance for the Education Sector. - *High Speed Training*, Accessible: https://www.highspeedtraining.co.uk/hub/data-protection-in-schools/, 12 May 2019.

54. Savirimuthu, J. (2016). EU General Data Protection Regulation Article 8: Has Anyone Consulted the Kids? - *LSE Media Policy Project*, Accessible: https://blogs.lse.ac.uk/mediapolicyproject/2016/03/01/eu-general-data-protection-regulation-article-8-has-anyone-consulted-the-kids/ 12 May 2019

55. UN Committee on the Rights of the Child (CRC), General comment No. 20, 6 December 2016, CRC/C/GC/20.

56. UN Committee on the Rights of the Child (CRC), General comment No. 1, 17 April 2001, CRC/C/GC/20.