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WAYS BEST PRACTICE IN BIG DATA CAN IMPROVE ESTONIAN YOUTH WORK

Master's thesis

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I hereby declare that I am the sole author

of this master's thesis and it has not been

presented to any other university for examination.

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Abstract

Estonia views itself as a leading technological country, and its e-state technology is well-known thanks to international news coverage. Technology should be used to benefit the work of all sectors, including the youth work sector, on which this thesis focuses. This thesis argues that policymakers should take more seriously the potential of big data for assisting in youth work. This is the first such investigation in Estonia into the potential for the use of big data and artificial intelligence in youth work.

Keywords: big data, youth work, artificial intelligence, innovation

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Introduction

As young people will inevitably shape the world's future, youth work is an important subject for all people. The ways young people spend their spare time might affect their future lifestyle and standards. Therefore it is important they organise their free time so as to develop their personalities in a meaningful way. Young people are in search for approval and youth work has to ensure that they find it, in a safe environment. Youth work holds a key role in preventing dangerous or risky behaviour, and also in developing the skills and abilities of youngsters.

According to the Statistical Yearbook of Estonia (2016), in the first quarter of 2015, the share of internet users among 16–24-year-old Estonian residents was 100%, which demonstrates that in Estonia the internet is a vitally-important information and communication channel for young people. Every movement online leaves a trace behind – these traces, collectively and unstructured, are known as big data. This data has a vast array of possibilities for creating different kinds of artificial intelligence and machine learning, which can support effectively any sector, including helping youth policy experts to target problems and offer alternative solutions.

Youth workers in Estonia are required to waste disturbingly large part of their time with bureaucracy, which keeps them away from their main functions. Among youth work development plans in Estonia, there are, as yet, few IT-related actions and goals. In Finland, it is believed that for it to be effective, youth work must be present where young people are, and that youth work should not be limited by traditional ways of thinking, therefore online youth work has been prioritised by initiating development of it on a national level. Estonian youth work is underdeveloped in this sense, but must not miss out the new wave – big data. Due to the relative novelty of big data as a topic of discussion in the youth work sector, it has not been investigated in-depth in Estonia until now. Thus, this thesis surveys and adds to an emerging field of literature, and helps policymakers to recognise the potential of big data and to plan actions accordingly. It is important to introduce big data to Estonian youth policy, so that more field experts can relate to it and retain it while designing and developing the area. Similarly, a paper contributing to youth work's overall recognition within Estonia is also

important, because it is a valuable part of youth policy which needs a higher prioritisation from the Estonian government.

The author of the thesis is of the opinion that innovation should not be inhibited or put on hold by bureaucratic 'red tape'. Estonia, with its brand identity of being a model for the competitive e-state, cannot allow itself to lag behind such a major wave in IT development as big data, however, it is not relevant only for the IT sector. The author explains how, in her opinion, exploration must be made of the possible use of big data in domains other than IT, business or marketing. The thesis provides an example of how to do so. Currently, the idea of youth work is thought to be interdisciplinary. Cooperation between IT engineers, lawyers, youth workers and others is required in order to feel the full benefit of big data.

The primary **objective** of the thesis is to draw attention to the potential of big data based analysis (including machine learning and artificial intelligence) in the area of Estonian youth work. The more that people active in the youth work sector (young people, youth workers, researchers, policy makers) recognise the value of big data, the more innovation can be expected within that sector. The related secondary **objective** is to explore the potential of ideas driven by big data analysis to be implemented within Estonian youth work. This secondary objective will be achieved by answering **two research questions**, asking which big data solutions have been used successfully elsewhere in the world, and what the trend approach to big data is among experts (from both the youth work and IT sectors). There are **three tasks** set for meeting the primary objective: to clarify and explain the interconnectedness of youth work and big data analysis, to collect data, and to process and analyse the data. A qualitative method has been chosen for data collection and content analysis. The challenges involved in youth work which are described in this thesis originate from field documents and from previous research.

This thesis is more intended to supply a **vision** for the future than concrete, tested and working solutions. Each big data-related solution takes into account legislation, resources, ethics and other factors. However, the general (challenges and) criticism of the use of big data, which frequently centres around its limitations and current

legislative shortcomings are excluded from this thesis; the focus is put on the **potential** of big data instead. Questions of "who" and "how" are also not in the area of interest for this thesis. The question of **"what"** is central to the study.

The structure of the paper is as follows: **firstly**, a theoretical overview is given of the shaping of youth work until the present day, and about the general purposes as well as possibilities for the use of big data. The overview of youth work culminates with the interest in the public sector for intensifying policy with the help of artificial intelligence. **Secondly,** the research objectives and methods are explained. **Thirdly**, data is collected and analysed for the purpose of answering the questions raised by the paper. **Finally,** conclusion is made, alongside suggestions for policy development and further research of the topic.

1. Literature overview

According to Perez (2002) the development of technology cannot be random, it must be stressed and led. The information revolution in the 1970s stimulated changes in company and organisation structures towards flexible net-worked corporations. The public institutions are not affected by competition, thus they aren't motivated to implement changes and they lag behind in the ongoing techno-economic paradigm. Science is no longer for engineers alone, now it is crucial for the state to be up-to-date with the modern accomplishments of the world in order to recognise its own opportunities, and to be capable of designing smart policy (Perez, 2002).

1.1 Conception of youth work

Belton from YMCA George Williams College in London, whose specialisation is professional youth work and has worked in youth work-related situations around the world, has, as part of a new concept of youth work, stated that youth workers should not treat youth any longer as if they have "innate insufficiencies", or as if there is "something inherently impaired" in the condition of youth. According to the new model, youth workers should not operate "on" young people, but they are to be of service to young people and need to appear more as servers (servants) than authority figures; the profession exists for working with young people to develop their influence and authority, rather than merely extend a youth worker's authority over them. Belton defines youth work in The Commonwealth Youth Programme as "the informal social and political education and empowerment of young people within a matrix of care, including enhancing young people's participation in issues that affect their lives." (Belton, 2012).

There does not exist a worldwide-recognised definition for the term "youth work" and there is even no agreement upon the exact age group of youth. For example, in Finland,

young people are defined as those under 29 years of age (Finnish Youth Act. Nuorisolaki, 2006), in Germany between 14 and 26 years (Social Code. Sozialgesetzbuch. Kinder- und Jugendhilfe , 1991), in Romania between 14 and 35 years (Youth Law. Legea tinerilor, 2006), and in Estonia between seven and 26 years of age (Noorsootöö seadus. Youth Work Act, 2016).

Within the EU, youth work is organised by and for youth with the cooperation of youth workers, it is based on non-formal and informal learning outside of formal education. The following definition specifies its features: youth work is usually voluntary, on the part of the young people served by the programme. It is an extracurricular activity, managed by a youth worker who can either be a full- or part-time professional, or a volunteer doing it in his or her spare time (Resolution of the Council and the representatives of the governments of the member states, meeting within the Council on youth work, 2010).

The United Nations (The General Assembly, 1985) define youth as persons between 15 and 24 years of age without prejudice to other definitions of Member States. However, it is also recognised that, apart from the statistical definition, the meaning of the term "youth" varied in different societies around the world and the definitions of youth had changed continuously in response to fluctuating political, economic and socio-cultural circumstances. Several UN entities, instruments and regional organisations have somewhat different definitions of youth, which the United Nations secretariat recognises.

UNESCO recognises youth as agents of change, social transformations, peace and sustainable development. UNESCO's philosophy towards youth work is that the most useful long-term solution is to give young people the skills needed in order to be self-sufficient, both during and following a programme (UNESCO Operational Strategy on Youth 2014-2021, 2014).

Australia has developed a nationally-agreed definition of youth work: The young person who is part of a youth work programme is always the most important consideration of that programme. The aim is always to bring confidence to the young person that enables

him or her to take subsequent actions that benefit him or her, and possibly others, taking a full role in society (Definition of Youth Work, 2013).

Estonia officially holds the standpoint that the wellbeing of the country depends on independent youth who are active members of society (Noortevaldkonna 2020. aasta visiooni loomise taustamaterjal, 2013). Therefore, investing in youth by devising developing activities is an investment to the nation and its future.

It can be concluded that youth work has to create an environment which stimulates young people to discover and apply their potential. A common characteristic of youth work is voluntary participation in the developmental and non-formal educational process. The purpose of youth work is to develop young people´s skills, identity, solidarity and participation in civil society.

1.2 Youth work policies

Youth policy is policy that regulates the life of young people (e.g. youth work, employment, health, family, crime prevention policy). Due to different national youth policies, in some countries there is a law which is specially designed for youth work (e.g. Estonia, Norway, Romania, Ireland, but in other countries it is integrated within other laws).

For youth work to deliver effectively, youth workers must be adaptable and willing to learn new skills as ideas on best practice in the sector change over time. Equally, in order to secure political support, youth work must be seen to be delivering on whatever the governmental agenda of the day is, and the media's reporting of youth work must be not only fair, but must also take into account the pressures on all concerned to deliver on their objectives (Cooper, 2012).

With many youth workers and youth work programmes now funded based on measurable results by their public and private backers, there has been discussion about whether or not evidence-based youth work can accommodate the need to be seen to be 'on the side' of young people, while also meeting pre-existing top-down targets, and whether or not these targets discourage the flexibility and adaptability youth workers

need in order to engage effectively with the young people in their care (Dunne, et al., 2014).

The United Nations World Plan of Action for Youth, adopted on the UN's 10th anniversary, was designed to detail a structure for national and international work to help young people (The World Programme of Action for Youth, 2010).

Youth workers need to be able to push back and defend their viewpoint if they feel that they are being asked to deliver a programme that seeks to manage, rather than empower young people, or if they feel that their programme does not allow for reasonable methods that could facilitate engagement with young (Sapin, 2013). Therefore youth work can have the desired effect merely when it is provided to voluntary recipients. Youngsters want society to acknowledge them as independent personalities. Young people must be allowed to make their choices. Doubting in young people's ability to make decisions can be as offending and discouraging to them as it can be to adults.

According to Estonian Youth Work Act (2016) youth work is the creation of conditions to promote the diverse development of young people (7-26 years of age) which enables them to be active outside their families and formal education acquired within the adult education system, and work on the basis of their free will. Principles for organising youth work are following (Youth Work Act, 2016):

- "youth work is performed for the benefit of, and together with, young people, by involving them in the decision-making process;
- upon creating the conditions for the acquisition of knowledge and skills, the needs and interests of young people shall be proceeded from;
- youth work is based on the participation and free will of young people;
- youth work supports the initiative of young people;
- youth work proceeds from the principle of equal treatment, tolerance and partnership".

The purpose of youth work legislation is to regulate the most specific aspects of the field, but it should be noted that the existence of regulation alone does not ensure real action and results. However, youth work cannot stand alone from other politics, and the

youth worker often needs to operate as a link between youngsters and other support providers. Youth workers are also required to follow other laws that are connected to the field (e.g. the Child Protection Act, Employment Contracts Act, Basic Schools and Upper Secondary Schools Act, and Hobby Schools Act).

As Jeffs and Smith claim, youth work is a fundamental part of civil society. It is wrapped up with associational life, community groups and voluntary organizations. It is also known that the relationships that workers form with young people – because they are born out of spending time together, a willingness to have fun as well as educate, and of involvement in local community life – can be incredibly powerful (Jeffs & Smith, 2010). Research proves that they are more powerful than other mentoring relationships (Hirsch, 2005). It is necessary to make society aware of the importance of youth work and value youth workers. Inactive young people with fewer opportunities shall not be taken lightly. More unoccupied spare time can lead to self-destruction or violations of the law. The importance of youth work is often as prevention or as a solutions-provider for these problems.

1.3 Historical perspective

The Young Men's Christian Association (YMCA), which is considered as the UK's first national voluntary youth organisation, was established in 1844 by a group of middle-class young men. YMCA indiffers from other organisations of the time by the matter that both – the founders and the target group – were working class.

'Youth work' as we call it now was initially linked to churches and got its base from Sunday Schools at the very end of the 18th century. The initiative and development work of pioneer sisters Hannah and Martha More resulted in a new, entertaining and caring way of teaching. Their main activities took place in rural areas. Hannah More argued that it was possible to get the best out of children if their affections 'were engaged by kindness', thus she excluded terror from her approach (Young & Ashton, 1956)

> *"* I encourage them [she said] by little bribes of a penny a chapter to get by heart certain fundamental parts of Scripture... Those who attend four

> Sundays without intermission receive a penny. Once in every six to eight weeks I give a little gingerbread. Once a year I distribute little books according to merit. Those who deserve most get a Bible. Second-rate merit gets a Prayer-book—the rest, cheap Repository tracts." (quoted in Young & Ashton, 1956).

The objective of the schooling was to shape good exemplary citizens (Young and Ashton 1956: 239).

With the emergence of industrialisation and the rapid growth of urban areas at 18th century in Britain, it began to be recognised that young people need special attention. Sunday Schools started practising informal education. According to Smith (2013) special recognition has to be given to Reverend Arthur Sweatman. He founded institutes for youngsters in the mid-19th century and stated in a paper read to the Social Science Association in Edinburgh in October 1863 that there was a need for the creation of a new social institution – the Youths' Institute. He claimed that young men have their 'special wants and dangers':

> "Their peculiar wants are evening recreation, companionship, an entertaining but healthy literature, useful instruction, and a strong guiding influence to lead them onward and upward socially and morally; their dangers are, the long evenings consequent upon early closing, the unrestraint they are allowed at home, the temptations of the streets and of their time of life, and a little money at the bottom of their pockets" (Smith, 2013).

It can It can be assumed that he based his statement and activities on the observation of similar initiatives. Booton states that this was the first ever promotion on behalf of youth work (Booton, 1985).

In 1870 Catholic Flemish Movement was founded and its members were from Catholic University of Leuve. University students were also members at small local organisations in Flanders and they were meant to exchange information between members and the board, but since sometimes they were lacking in motivation, their performance was not of a good quality. The secretary of each local organisation had to

present a report of their actions to the general committee in Leuven and during summer and Easter holidays they also had meetings. Regular journals and circular letters were published; the local associations also kept in touch with each other and had meetings and rallies (Vos & Gevers, 2009). Here it appears that different kinds of information and data were intended to be collected and exchanged frequently and carefully in writing and orally.

The base for Estonian youth work was constructed before mid-19th century by organised free time activities in church congregations, student organisations, voluntary unions and pupil groups (Taru, et al., 2015). Estonia is one of these countries in Europe in which youth participation in decision making, and the importance of youth involvement, were acknowledged and regulated by the regulator before the Second World War. Its purpose was to nurture active citizens, and the main method was youth organisation. The law defined youth as Estonian citizens younger than 20 years of age. The law established relevancy and the possibility of youth merging and constituting youth committees in local level. Education ministry was responsible for organizing youth work (Noorsoo organiseerimise seadus, 1936). Nowadays there are the Estonian Youth Work Strategy (2013), the Youth Work Act (2016), and the document Professional Standard of Youth Work (2013).

If traditionally youth work was presumed to target transferring morals and an ideology from adults to youth, then nowadays it is seen as work with young people that supports personal development through carefully planned developing activities (Dunne, et al., 2014).

Young (1999) named the principle of youth work as following: “young people’s development not as citizenship or life skills´ training; not because they are marginalised, alienated or excluded, not because they cause problems or are problems but simply because they are in the process of creating themselves”. Youth work requires outside funding from funding bodies, and, whether by accident or design, youth work organisations have often felt compelled to pledge that they will guide young people in line with the expectations of the funding body (Young, 1999). It occurs that youth work

has been innovated through the history according to the needs and demand of youth and society.

According to Coussée (Ghent University), youth work needs a shared professional identity. Since 2008, the Europeans regularly organised debates and discussions on the history of youth work policy and practice in various countries in Europe, in co-operation with its partners. Youth work throughout Europe seems to suffer from a perpetual identity crisis. In some countries youth workers and even youth policymakers tend to turn their back to critics. Unintentionally this splendid isolation makes youth even more inaccessible and/or useless for vulnerable young people. In other countries the attention shifts from an identity crisis to an efficiency crisis. While funding bodies and government have a need to see results from youth work that fit their own models, it is also the case that some countries, like Germany, focus on wider criteria than, for example, the often efficiency-fixated programmes of the UK (Coussée, 2012).

The written self-administered questionnaire technique for in-person surveys emerged in 20th century and provided respondents with privacy regarding sensitive questions. Computer-assisted personal interviewing technology and video computer-assisted self-interviewing technology (used since 1960s) further facilitated data collection. Drug use, the sexual and criminal behaviour of young people, but also the possibility to question those respondents to whom literacy is a problem, gave researches important reasons for using this technique (O'Reilly, et al., 1994). Having youth encouraged to be open with their answers means having more self-reports available to design evidence-based and potentially also more efficient youth policy.

From the cited literature, it appears that need for youth work has been consistent and recognised over a long period of time, even if the goals or methods are regularly being altered according to changes in thinking and philosophy. Changes in the environment, technology and other matters have an impact on opportunities, but also on dangers in young people's lives.

1.4 Virtual youth work

Sweatman (Smith, 2013) mentions his concern in 1863 for youth being attempted on the streets, and he youth from going there. Nowadays youth workers can approach young people in a space they have chosen to gather and feel comfortable – streets, parks, shopping centres, playgrounds and internet. Mobile youth work is an open form of cooperation between the youth worker and young people. The aim is to provide group counselling. Mobile youth work began with the aim of targeting those young people who spend their time on the streets, who organise group gatherings that may or may not be gang-related, and who might be involved with crime, because youth centres could not provide them with their needs nor discourage them from spending time taking part in negative activities on the streets internet-based mobile youth work is a later development which, in Estonia, has mainly focused on distributing information about safe behaviour on the internet (Ristikivi, et al., 2012).

As there is no unique definition about youth work, nor is there definition upon internet based youth work. In Estonia there is neither a concrete term for youth work that is being done via the internet. Thus it is named as e-youth work, internet youth work, online youth work (in Finland and in the UK), digital youth work or virtual youth work. Web based youth work includes virtual youth work, virtual co-existing service, web-based dialog and most important principle – understanding – applies nevertheless. Very important is paying attention at youth pronouncements, because this is only possible observation that youth workers are left with in virtual world (Sinisalo-Juha & Timonen, 2012). It can be concluded that youth work should follow its general values in any environment, even though means might vary.

By moving online, youth work has had more success in engaging with young people, many of whom, while keen internet and social-network users, might never have voluntarily set foot inside a youth centre. New forms of youth-work delivery not always based around a bricks-and-mortar presence can help to broaden youth work's catchment area (Dunne, et al., 2014).

Hungarians Szekely and Nagy argue that it is important for youth workers to understand that social media is not a tool for today's youth (what?), but it is an environment (where?) and successful youth work happens also via technology. Being present in internet is the least that youth worker can do in nowadays conditions. Szekely and Nagy visualise it as if "we are talking about waters abounding in fish – we just have to find the appropriate net to be cast". It is essential for online youth workers to understand that their work is real and the subjects of are achievable. They distinguish passive (spreading information) and interactive (mutual content creation) approach of virtual youth work. Even more, they claim that "eParticipation is the gateway to offline participation" However, they criticize that virtual participation itself is not being taught at formal, non-formal nor informal level and that the virtual participants are not being directed towards eDemocracy (Szekely & Nagy, 2011).

The author of the paper believes that while determining an action plan, youth workers should also develop a plan about how to win on their side people who belong to youngsters' world. Without creating network or not having relationships on local level and in the internet with the existing network, youth worker cannot help young people on mediating their opinion. The role of youth worker is divided between communication and creating cooperation relations with young people.

Since working with youth is grounded on communication, it is important to pay more attention on how is communication being managed by important organisations in youth work sector. (Lees, 2014). Nieminen (2007) suggested already a decade ago that each (youth) organisation should pay attention on developing their employee's virtual youth work competence (Nieminen, 2007). Finland made accomplishment towards improving youth work sector in 2010 by founding National Development Centre for Online Youth Work – Verke. Its purpose is to popularise online youth work, but it also performs as official tracker and announcer of latest scientific developments. Special emphasize by Verke is being put on local municipalities and their youth workers to transfer them the role of virtual youth work promoter.

Online counselling was adopted in Denmark in 2011. Clients are being offered career services via instant messaging (by phone, e-mail and Facebook), which is also available

in the evenings and weekends. The questions can be asked anonymously. Online counselling is provided by 14 full time and several part time staff members who have the option to work from home. It is also being experimented with new possible channels, virtual group counselling and web seminars. Psychological online-counselling has proved successful in Estonia as well, the reasons for its popularity were easy accessibility and anonymity (Männiste, 2010).

Generally career counselling is a private one-to-one service, which is often why those in a real need for career counselling are often afraid to go for the meeting with counsellor (Amundson & Thrift, 2008). This indicates that new methods are needed for providing the service. However, from the findings of Mahnova it occurs that not always the workers of a career information centre in Estonia are competent enough to use IT or to see its potential for reaching bigger group of youth. She suggests that all higher education institutions which are teaching youth work, to add the subject "virtual youth work" to their curricula, if they don't have it yet. She presumes that information about the dangers of virtual world should be addressed via role plays, study films, trainings and by doing so, cyber bulling could be decreased (Mahnova, 2014). Similar were the findings of Kadri Riis (2015) in her master's thesis where she investigated the supportive role of digital technologies in youth work. Her experiments with selected methods proved successful, but she also recognised the need to rise innovation maturity among youth workers for using technological tools in their work (Riis, 2015).

It can be noted, that not much has changed during last ten years about young people's information search skills. It was stated that by 2006 young people had become active internet users (UNESCO, 2006), but did not necessarily know how to find desired information (Virkus, 2006). Limited knowledge appears also from the study of youth information availability (Ernst&Young, 2016), which outlines that internet is most popular information obtaining source, but more than half of respondents do not consider it very easy to find information about other topics than entertainment (games, videos). The study concluded with need based suggestion to create all-embracing information source, but warned for its additional time cost for the content producers (youth workers). The author of current thesis cannot entirely agree with the latter, because user comfort depends of the system design, automated web robots (Internet Bots) can update

information according to original source without creating extra daily duties for youth workers. The study of Ernst&Young indicates unpopularity of existing youth web pages (least popular sources of information) and this should make online youth information providers attentive, because their solutions are not in accordance with favours of modern youth.

According to Hannes Sildnik (active international trainer at youth work sector) it is responsibility of the youth worker to be aware of youth needs for information and to provide them with trustful sources. Youth workers have to keep themselves up to date with information, but also teach youth cautious behaviour and critical attitude towards sources. He concludes that youth workers should be active members of network, but they should also be able to perform initial consulting and feedback (Sildnik, 2015). Since with the growing amount of information, supply of doubtful information is also rising, nowadays it might be challenging even for youth workers themselves, especially those of beginners without their own network, to sort out appropriate information. It can be also very time consuming, to keep oneself up to date with new information from different sources. Estonian youth workers reported time factor as one reason for not seeking for new digital practices for their work (Instituut, 2016). The author of this paper agrees with Sildnik (2015) about that youth workers are responsible for training young people how to be smart internet users, since formal education is not doing much for it and parents are often lacking knowledge themselves. Addressing the opportunities and dangers of internet could be a good example of two-way interaction, because there are a lot of things that young people can teach to others as well.

1.5 Emerging need for innovation

Cooper (2012) believes that changes need to be done in order to develop the practice methods and models and to preserve importance of youth work.

> "Existing models need updating urgently, and multiple models will be required. The next step is for youth workers in all roles to re-engage with systematic observation of their own practice, with critical reflection, and with thoughtful reading in a range of disciplines to give life to new models." (Cooper, 2012).

Researcher Pierre Mairesse (Ghent University) states that youth work needs improvements in European and national level and he suggests that:

> "...interconnectedness of services, must be sentenced; education and training of youth workers must be adjusted to the needs of young people; opportunities for further studies must be provided for youth workers" (Mairesse, 2009).

According to Sapin (University of Manchester), if youth workers know a great deal about the places where the young people they are serving live, and what they do in their communities, this helps effective activities to be planned, and prevents youth workers addressing young people in a patronising way (Sapin, 2013). Youth work can be organised and implemented by different activities and in different environments. A wide range of activities can be regarded as youth work, but they should all be in accordance with law, nationally established objectives and professional ethics (Schlümmer, 2013).

According on the latest (to be published) findings from an innovative research of Karaseva, et al. (2017), where connexions between relationships of teachers` achievement goal orientation and ICT integration in teaching are studied, it occurs that achievement goal theory is a promising framework for understanding how the integration and application of ICT in teaching happens (Karaseva, et al., 2017).

Based on the previous ideas, the author of the thesis argues that likewise technology has developed other areas of life, it should also be seen relevant for youth work. Several threads can be recognised between youth work and IT sectors e.g. it can improve quality of youth researches and variety of services. Youth workers have different roles and tasks which depend of certain target groups as well of the problems and challenges. Over the last couple of decades a new type – virtual community – has emerged, which need more targeting by youth work sector. The author also suggests for the responsible organs of the domain to start seeking for smart solutions with the help of big data and artificial intelligence (AI).

1.6 Big data

Even though there is no clear agreement about the definition of big data, it is generally agreed upon three characteristic properties. Firstly, volume of the information created by sensors, social media, GPS devices, internet-related machines etc., has to be very large at size. Secondly, it should have high velocity rate (e.g. social media networks), meaning less time expenditure for processing the information. Thirdly, variety of data: it can be structured and unstructured (Delgado, 2016). However, there are also three other characteristics: veracity (data needs to be cleansed before using), validity (appropriateness of data), volatility (the extent while data is valid) "Big data analytics" is the new term for analysing vast amount data. He also states that big data analytics is career option for people from different domains with different qualifications (Prasad, 2016). Although generally the people researching big data remain in the borders of business, IT, machine learning or mathematics, this encourages the author of current paper to explore big data related matters on the field of youth work.

Big data can assist the companies to understand their current position in the market and how are they progressing compared to their competitors and to make innovation. The Boston Consulting Group revealed in its study that 65% of strong innovations mine big data or social networks for ideas (Ringel, et al., 2017). According to Grus, the task of data scientist is to find out the most accurate and deep understanding from messy data (Grus, 2015). Their job task is rather traditional by nature – they need to analyze statistically the past to project the future – predictive analytics. There is still a lot of technology development that needs to be done in order to unlock the potential of big data before it is possible to apply it to businesses massively (Srinivasan, 2017).

Irish Government's Department of Children and Youth Affairs commissioned an in-depth overview of published research literature regarding youth work with the aim to help policy-makers, practitioners and researchers with answering questions or solving problems:

> "Identifying an evidence base for the youth work sector is critical in developing and contributing to a more informed understanding of the value and relevance of youth work for children and young people" (Dickson, et al., 2013).

Educational Data Mining is (EDM) an emerging discipline, concerned with developing methods for exploring the big data that come from educational units. Baker and Yacef (2009) have named goals of EDM as follows: predicting students' future learning behaviour, improving domain models, studying the effects of educational support that can be achieved through learning systems, advancing scientific knowledge about learning and learners by building and incorporating student models, the field of EDM research and the technology and software used. Most commonly spread critics about using big data for EDM so far is concerned about being one unit-cantered and not transferrable**;** privacy of the profiles needs careful protection by and from those it is shared to; discovering plagiarism is complicated (Baker & Yacef, 2009).

In the future the information flow will be much bigger and therefore every sector should have knowledge about big data. There have already been positive outcomes of using of big data analysis, but further on the intelligence of both, humans and robots, will evolve even more, thus it is reasonable to begin exploring its potential with and for youth.

1.7 Artificial Intelligence in policy design

AI is already present in credit card payment algorithm, GPS, Google search engine translate service, cameras with face recognition and other areas, while it is also entering the mainstream in other fields through, for example, self-driving car, personalised education, and health services. AI requires strong processing power from computers, and big data input. So far, privacy has been less of an issue for the majority of people engaging with AI when algorithms are working silently in the background of a trusted program, than when the robots are working directly with end-users (Rossi, 2016).

Youth policy combines policies which have great impact on young people's lives, because youngsters' lives are complex as well. Hence it is becoming more widely recognized that youth work needs to be considered more interdisciplinary than it has

been so far. For some developments, such as implementing big data and artificial intelligence, it is binding to cooperate with other sectors.

It is worth mentioning, that big data can be useful and successfully analysed also without users profile. In Australia there was a youth study carried out by big data analysis. The goal of the study was to find out what skills do employers expect from young people and how are they in accordance to the real circumstances. A robot was created to scan more than 6000 websites, from which 4.2 million unique job advertisements for early-career roles (required for 0-2 years or 3-5 years of work experience) were analyzed from over the past three years (AlphaBeta, 2016). This can be seen as artificial intelligence taking first steps for designing children and youth related policy. Estonian Youth Work Strategy (Noortevaldkonna arengukava 2014-2020, 2013) appoints to implement more of so called smart youth work conception and to use more of IT opportunities, but especially to raise youngsters' digital literacy, incidentally pointed above referred Australian study out the same issue.

Public sector, possessing big data and knowing needs of youth work, can provide those to programmers and order custom-made robot from them, which would also remain in the frames of law and security regulations. Demand, based on actual needs, should be stated from youth workers or policy makers, who should cooperate with lawyers and programmers for finding appropriate solution. It is also worthy to analyze whether already existing successful solution in another context (e.g. business or marketing) might be adjusted and taken over to youth work sector. First step is taken by cooperation of Estonian Youth Work Centre and statistics Estonia for mapping all databases that consist information about youth. From there on the next step is to clarify what could be done with this existing data.

Although cooperation within various youth work sectors functions, there is need for even more close interjectory collaboration. Representatives of different youth work areas have often various visions about development in this field which may, without active multidisciplinary communication and cooperation, delay the process.

It is worth to encourage youth work specialists to explore how translating raw data into meaningful information could facilitate understanding youth and improving youth work.

In the Technology Policy Institute panel participants from Facebook, Google and University of British Columbia explored the policy implications of incorporating AI into opportunities for increasing productivity and economic growth. Hwang (2016) emphasised that AI and machine learning are practical engineer disciplines which are being benefited of by millions of people every day, it is not some blurry future fantasy. He stirred to be aware of what is actually happening in engineering level and make sure not to fall to popular culture conceptions that might exist around this technology. Common confusions in public policy debate is that AI is not robotics, but it is, because AI can exist without physical robotics and vice versa. They both present interesting public policy challenges on their own and often together they produce another interesting set of issues to discuss (Hwang, 2016). Wallsten (2016) warned that if people don't get more nuanced idea of what AI is, then the policy responses to AI risk being really misguided and possibly holding back a really valuable suite of technologies (Wallsten, 2016). All of the participants recognised that it is important to ensure that society has knowledge about what AI is, how it is developing and how it could be used for different sectors of governance. Therefore there needs to be clear understanding for public about what AI is, what it can and can't do.

2. Methods

The research questions and the goal of the research were presented earlier in the thesis. The empirical material for this thesis is collected by **qualitative** methods due to the exploratory nature of the thesis. Firstly, the current problems and issues in Estonian youth work were demonstrated by **document analysis** referring to literature– the author has made a relevant selection of issues (although not based on priority) for further investigation in empirical part (Appendix 1). Also, previous research findings and other reported evidence of innovative solutions were carried out and analysed. Secondly, **interviews** were conducted in order to understand views among experts (Appendix 2). According to Dickson (2013) 58% of youth work studies use interviews as method of data collection and study design. This thesis covers a large number of youth work-related issues, hence it contributes to the currently-available literature on the topic. In this paper not only academic sources, but also official homepages and secondary documents proved to be helpful.

In the previous chapter it becomes apparent that innovations in the youth work sector cannot be looked at in isolation from rest of the society, thus it is necessary to interview people who are active in different disciplines. The respondents were found and contacted using the snowball method, with experts from both fields – IT and youth work – represented. Interviews were conducted in May 2017. Big data analysis, machine learning and AI are relatively new introductions to youth work, and this justifies the snowball approach, given that there are not many experts in the field. Some difficulties were faced in getting consent for the interviews because people tended to consider themselves not qualified to talk about the topic, or they did not see connection links between the subjects. However, ten respondents were found and interviewed in a real-time meeting via Skype, or via email, according to the preference of the respondent.

Since respondents were deliberately selected by their different fields of occupation and experiences, the questionnaires were semi-structured and adjusted to each person accordingly.

Among the respondents there were one scientist experienced in youth-related studies, one youth work officer, one employee from a youth organisation, one employee from a youth workers' organisation, one employee related with open data who works for a foundation; four IT experts (these were employed by Google – Senior Data Scientist and Machine Learning Engineer, Proekspert – Data Scientist, Swedbank – Software Developer and startup entrepreneur, and also an former Network Engineer – Microsoft), Geonni Enterprise LLC – experience in building big data platform. To ensure the anonymity of the interviewees, results are designated and presented as A, B, C, D, E, F, G, H, I, J (Appendix 3).

Although there are other distinctions in the research methods, the most common classification is between qualitative and quantitative. According to Merriam (2007), qualitative research concentrates on giving an insight, discovery and interpretation rather than hypothesis testing (Merriam, 2007). That is in accordance with the intention of the current study. The main idea was not to prove a statement, but to explore what can be done with modern technology to improve youth work in Estonia. the above described approach helps to contribute to the development of new approaches in the youth work field from the perspective of technology.

3. Empirical research

3.1 Best practice of artificial intelligence

Developments among artificial intelligence are fast, because it is not just about programming, machines are learning themselves and sometimes it is not accurately predictable how fast they reach the expected goals. This chapter explains how chosen best practice from the world could turn out beneficial for Estonian youth work.

Hariston argued that Conversations about policy should discuss what are the ways to channel those gains of AI and make sure our societies benefit from the exciting technology. E.g. machine learning by Facebook are: computer vision, ability to understand human speech, teaching interfering without programming each step. “It is important to us how we can, not just make services better, but what kind of policies should be made to ensure that these gains are widely spread” (Hairston, 2016). The image recognition technology helps the blind to “see” Facebook. These solutions not only facilitate lives, but also help people with fewer opportunities to feel more included.

In 2015 there were nearly 27 000 youth with educational special needs studying in Estonia. Accessibility of education and youth work for young people with special needs in Estonia is different in regions. The situation could be improved by offering different support services (most of all providing transportation and mentor). Support of surrounding community and willingness of youth workers to work with youth with special needs are also important factors. Digital solutions can be helpful for facilitation studying as well as for managing domestic life for those youngsters (Praxis, 2016). The case of Verke is a good example for prioritizing virtual work with youth who are in special need of support. In internet it is possible to somewhat ignore the differences of

life conditions of youth and enable them to get access to at least some of the same services regardless of their individual limitations. Youth work sector has now possibility to open and support youth potential more than before, but it is also believed to require more resources, including competence and new measures (Noortevaldkonna arengukava 2014-2020, 2013).

3.2 Empirical evidence of Big Data in the Youth Work

The aim of interviewing was to explore what could be the potential benefits of big data analysis (including machine learning and AI) for youth work sector in Estonia. It was not the aim to map or to assess the knowledge or interest of respondents´ about this topic. Therefore it is not necessary to connect an answer with a specific respondent. The focus is on analysing presented ideas according to applicability to youth work. Even though questions asked from respondents were altered according to their profession and background, the answers can be analyzed on the same ground. The analysis is divided into three parts. The first part concentrates on potential applications for big data and AI in youth work. The second part explores enablers and the third part points out barriers for applying possible applications.

There were respondents, who had personal experiences with big data, or clear understanding about it. However, some of the respondents could not disclose their current activities due to business secret. The pool of respondents big data-related experience is following: 1) predictive maintenance – predicting usability of a machine until its next breakdown, based on big data (temperature, pressure, vibrations etc) which is being collected automatically by the machine itself; 2) user experience evaluation – going through data and finding solutions; 3) programming a web robot which predicts the possible outcome of the sport event for gambling purpose and creating an AI which diagnosed health problems; 4) training machine learning models for data products, using unsupervised learning for data standardization and building recommendation engines for recruiters to source and hire candidates easily in Linkedin; 5) investigating open data and learning analytics. Professional experiences of other respondents, which they themselves or the author considers relevant to this study: 1) coaching youth workers, developing organisations, assessing and developing the implementation of

youth work in local municipalities, managing projects related to children and youngsters; 2) researching different youth related topics; 3) launching and managing projects and activities for citizen participation, e-services and youth citizen rights; 4) IT specialist and youth leader in youth organisations.

All of the respondents recognised that big data analysis has a lot of potential and AI can significantly facilitate lives and sectors from all fields, including youth work. The results are combined and presented in Table 1:

Table 1

Big data in youth work

<table>
<tr><td colspan="2">Potential applications for Big Data and AI in youth work:
predicting emigration of youth with Churn Prediction
youth work (and NGOs) can be marketed more efficiently
increasing efficiency factor for youth who have participated in youth work
career counselling can be facilitated by algorithms
speed the process of collecting information and decision making for policy makers
ensure that youth can access qualified information from internet
tool for transferring experiences gained in youth work to formal education
achieve personal approach methods for working with youth
improve daily work
offer youth free time activities, which are responding to their demand and interest
bring together the ones in need for help with the service providers</td></tr>
<tr><td>Enablers:
already existing platform and solutions (ID card, e-school)
existing indicators for researching youth
connect available capacities (universities, experts, solutions)</td><td>Barriers:
risk that robot operates in an unwanted or harmful way
generalizing the results of big data analysis to wrong units
a part of youth workers have poor IT skills
parents might not be interested in using web solutions
innovation solutions are too costly for small organisations
not enough open data available</td></tr>
</table>

Potential applications

Respondent C. Big data could help finding out about the reasons what is preventing the organisation to grow its membership. It could facilitate recruiting people and ensuring that youth can access qualified information from internet. Estonian Youth Work Centre has developed a web page (stardiplats.ee) for helping young people to analyse their experiences from youth work and thereby see the value of it. But it didn't receive expected popularity. Now there is a need for another virtual tool for recognising those experiences gained from youth work and transferring to formal curricula by replacing some compulsory lessons with it (e.g. transferring hobby school music lessons to school curricula). Foreign partners are also interested in it, so they have requested the page to be made available in other languages as well. Obstacle could be that youth work is being understood differently in different countries, but it must be adjusted, because young people are anyway travelling and studying abroad. It would be interesting to know what should be the estimated population per municipality for being able to hire a youth worker, there is no such numbers carried out yet. Very clear, perhaps even real-time overview about the situation of youth work in Estonian municipalities could be reached, which could be very helpful for policy makers.

Respondent B. It is possible to get more personal overview about Estonian youth, rather than only anonymous statistics and then approach those in need with personal solutions**.** Young people's access to information could be improved**.** Young citizen participation could be facilitated, for example by gathering their opinions and ideas, empowering their voice is also a possibility.

Respondent D. Information about youth participation in different fields can be gathered and analyzed to see what the achieved results are and how to facilitate and improve daily work.

Respondent E. Finding out reasons for different causes in larger scale can be done. Already existing tools could be used more effectively with the help of robots (e.g. for data entry – there shouldn't be new form to fill but the robot could send information from one form to others). E-government platform eesti.ee should be developed for youth section. All citizen related applications (e.g. expressing their opinion about

something or having a say in ongoing debate). They should also be able to give feedback or vote or contribute in any other way via mobile phones easily and quickly (by scales). It is important to offer youth free time activities, e.g. similarly to Pokemon Go there could be orienteering games, which could be made more interactive, interesting and smart by using big data. For example in Finland they have used media data and integrated all of that with GPS, so that it is for example possible to virtually walk around in Helsinki in 1950s and find narratives.

Respondent F. The amounts of data collected through daily applications are immense and with careful implementations deriving conclusions from them is not too farfetched. The hard task of 'finding jobs for youth' could become much easier. Identifying youth's skills and capabilities, then matching it with the best possible opportunities for them can be invaluable. An abstract search engine going over multiple data sources is merging the duplicate information and rank appropriately. There is no reason why this cannot be applied to multiple youth organizations. Given an aggregate profiles of people who did the same job and delta of their previous skills vs. post, it can be inferred on what jobs give what abilities to young people working in them, and then can be applied even if the person do not list it in their resume. Ranking algorithm could help youth workers to find cooperation partners in other fields. For example entrepreneurs in rural areas could be linked with youth workers, based on same interests. They are effectively same from machine learning perspective, with different features to be trained on. One can build classifiers after understanding the features that play the role in reasoning of emigration. This can then be applied to young people who have yet to be emigrated but are very likely so. In the industry this is used for "Churn Prediction", i.e. estimating the likelihood of a client stop using your product, and essentially they are the same thing.

Respondent G. While considering and observing different indicators, which are believed to put young person in risk for adopting criminal behaviour, then it would technically be possible to say who is in risk. Analysing big data can unexpectedly reveal some interesting patterns, which could provide understanding about some problems and possibly indicate on solutions

Respondent H. People make decisions in their lives with very limited data gained from their experiences. If someday big data could be harnessed with proper methodology, many things could be achieved. Public transport can be arranged more efficiently just by using the phone (bus network usage rate data). With this information limited amount of transports could be arranged more efficiently. Isbank, which is one of the biggest bank in Turkey, is using character testing methods to understand their next possible employee. The candidates enter information about their character to the system. This system asks same questions in different ways to understand the person better. The system then makes conclusion about the user and compares with the data which they already have in their system. Because it is a vast employer, it already has thousands of characters and also data about the employees. Character patterns are being matched with the possible candidate to understand if they are suitable for the company or not. However, to understand the youth and their problems, the AI can analyse and find the patterns of the most common problems that youth have. AI must be smart enough to understand the meaningful pattern of sentences of each individual and provide the most concerned problem of the youth. Using thousands of people's information, statistical data can be created in order to understand what kind of people are likely to leave the country. This information can be used to find possible people who most likely will try to leave the country, so they could be reached and offered a reason for staying.

Respondent I. Government can create a path between available opportunities and match them with the interests and capabilities of the youth. Relationship between the actual job requirements and personality traits can be bettered by using big data analysis. Tagging and using the right keywords for all the different activities could help spread the information in a small form among colleagues (youth workers). A special lingo could be developed for using and understanding the keywords. More scientific style, which is similar to research papers, can be adopted to create a template for all activities and then they can be searched and understood easily.

Respondent J. The most valuable big data is in the public sector, but it is in different domains. So, if this data comes together, more meaningful data could appear. For example, if someone's mobile phone location signal originates from an airport and they make check-in this airport from social media, then this data could be merged after a few

patterns for this person. From the social media, a lot of analysis could be made about happiness, politics, etc. By the help of AI, people's choices could be analyzed and clustered for predicting potential emigration. This could be like churning in the telecommunication sector. People make choices before emigrating, therefore similar patterns could emerge.

Enabling factors

Respondent A. Policy makers are open to innovative ideas.

Respondent B. Yearly implemented national research about youth and youth work (Noorteseire), which is based on many indicators, is an achievement. In Estonia policy makers are open for innovation. There are already databases which include data about youth and there is overview about them.

Respondent C. There is already existing online tool for youth to analyse their skills gained from youth work, and to collect those experiences in a portfolio (stardiplats.ee). Youth centre´s virtual log book is being used in some places, it consists data of visitors. Smart youth work conception along with application plan made by Ministry of Education and Research is about to be approved by the government.

Respondent E. Estonia should expand usage of ID-cards and mobile-ID and implement good practices from private sector. Public sector should take over the attitude about communicating with clients from private sector, because there are already working and effective methods, for example companies are constantly in touch with their customers, and government should be as well. It should be possible for youth to express their opinion about some local level question in Facebook or Snapchat by identifying themselves with their mobile-ID. More IT students should create smart and applicable solutions based on big data during their studies or for graduation.

Respondent H. Facebook detects depressed or suicidal people and offers some kind of personal attention or help for them.

Respondent I. Government can create a path between available opportunities and match them with the interests and capabilities of the youth. Capable scientists need to be

employed along with social media companies to bring data and science together to achieve a result. The automatic form filling feature in web browsers which show a suggestion below a form field when it recognises the type like name, email address etc could be advanced. The improved version could be created to fill forms faster based on previous answers and make data entry work faster. Big data can be quite fruitful if all the elements such as government, corporate, scientists etc are working together to solve a problem.

Respondent J. Health status and history could be saved and analyzed to see whether work affects (mental, physical) health of youth.

Barriers

Respondent C. There are lack of skills for marketing youth work and its organisations. There is not enough knowledge about how to be more visible to partners and how to attract new members. Stardiplats.ee for some reason didn't receive expected popularity. Youth work is being understood differently in different countries, for those youngsters under 18 years of age, their parents might not want to bother themselves with giving consent for online actions. Cooperation from the aspect of exchanging information between different ministries and other governmental institutions is poor. Documenting youth work quality assessments in some municipalities is a problem, because it is depending solely on a employee's self responsibility, so it might get complicated when the employee changes. Therefore the local municipality doesn't have overview about the youth work situation in their territory. Among youth workers there is little knowledge about processing personal data. Youth workers competence for using IT is low, youth work curricula in universities is not preparing them for this either. Innovative IT solutions are too costly for small units.

Respondent D. Youth workers IT-capacity is low. University curriculas are not in accordance with needs. There is small knowledge about data protection. There is no common understanding about the nature of virtual youth work.

Respondent E. There is not enough open data (available data), but institutional data should be free, because people within one unit might be lacking inspiration about what

to do with that data. There is higher chance that from among wider audience there are coming more relevant ideas. Youth under 18 years of age are not capable to use ID-card reader. Mobile-ID monthly payment is too expensive for children, parents are not willing to pay for it and currently there is also not so much need for using it. It could be free for youth up to 19 years of age.

Respondent F. The results of big data analysis might not be appropriate to generalize, but if they are being generalized anyway, then they can do harm. For example building classifiers on identifying potential criminals requires careful consideration as early models would over fit to demographics, which might lead to identifying many low-income teenagers being identified as potential criminals just because of their surroundings, and thus limit their future. If big data is used carelessly it can derive totally biased conclusions which can hurt the product it is fed into, but that is due to inexperience or malice of the analyzer, not the data itself. Sharing too much about their political inclinations without much thought on how this can tag them into specific categories can easily be used against them in the future.

Respondent G. Microsoft created a robot (chatbot), which was scanning and analysing Twitter posts for creating tweets of its own. Within twenty-four-hours the robot started giving out swearing and racist and notifications. So here it results that no matter how intelligent the robot is, nowadays there is still risk that it behaves in unwanted and harmful way. People do not understand how many conclusions can be made based on small data, which they give away (e.g. to Google). This might be dangerous, therefore it is good that it is being limited**.**

Respondent I. Generalizing and relying on predictions is dangerous.

3.3 Findings and recommendations

There is no compulsory common basis or a structure for using IT, it is currently based on everyone's personal motivation and creativity. If there was a common strategy for using standard solutions for some aspects, then it could raise the quality of youth work

implementation on nationwide level. It would also make youth workers and organisations more competitive on national level.

The author of the thesis supposes that the tool (stardiplats.ee) mentioned by respondent C, could be taken step further with the help of AI. The skills and qualifications that young people enter to the forms, could be scanned by robot, at the same time it could compare those properties with the skills that are required on online job advertisements. And it could also provide suggestions for participating in upcoming events or projects, based on individual profile of the person. Youth could see the value in participating in your work and this could motivate them to take part. Overall it could expand impact of youth work.

Paying attention on the IT-skills of youth workers cannot be an incidental secondary requirement. First steps towards virtual youth work should be taken by universities by adjusting their curricula. Limited budget, especially in smaller municipalities, can restrict access to the technologies as well. Youth workers could act as role models and teachers of smart and efficient users of technology.

It could be argued that youth are not interested in participating in social discussions, and even if that is the case, it means that their initiative needs to be initiated. As suggested by respondent C, Estonia already has significant technological means and channels (such as microchip ID-cards and eesti.ee), but they could be made more up to date by approaching from youth perspective.

Combined impressions from respondents about IT-skills of youth workers are that this competence varies within the sector. It was recognised that using modern technology facilitates youth worker´s daily job, but currently it is everyone's individual responsibility to obtain these skills. This again might affect the quality of youth work and place some youngsters to disadvantageous situation, because they are being left without the opportunity to participate in modern activities and projects, or they are being left with youth bureaucratic youth worker. Knowledge about data storing and safekeeping hasn't been prioritized as much as confidentiality

Big data and artificial intelligence proved to be actual and appropriate topics for youth work studies. The author of the thesis gives following recommendations for further investigations in the area of youth work and big data and AI:

- Investigate more thoroughly the idea for nationwide IT strategy for youth work (its purpose, features, and tools).
- Find out what exactly are the methods for improving career counselling by big data analysis.
- Investigate possible solutions from such aspects as law, resources, ethics.

Conclusion

The thesis gave theoretical attempt to enrich the current literature and understanding of the phenomenon of big data analysis and artificial intelligence in youth work. However, youth policy makers and implementers in Estonia have started to show interest towards using big data. The main purpose of the thesis was to raise awareness about the possible interconnectedness, so that it could also reach to public i.e. to people who are doing youth work as their daily job and to IT experts, who are delivering the solutions. Additional goal was to explore the potential of big data and artificial intelligence for youth work.

Theoretical overview was given about the current state of youth work and possible connection point with technology. For learning more about the topic from primary sources, interviews were conducted with experts from youth work and IT sector. Answers to main questions of the thesis were reached.

As a result of this paper, there are better possibilities for further research and for establishing hypotheses. The knowledge gained from this research is going to be presented to the Estonian Youth Work Centre and to enterprises which took interested of the topic during the study was conducted. Answers to the research questions are expected to give an initial understanding about what kind of opinions there exist among the experts regarding to the topic.

Whereas people who are active on the field of youth work can target the problems of the sector, and some of them also know how to as the „right questions", which derive to answers and solutions, there are people from other fields, who can provide needed solutions. Therefore it is important to intensify interdisciplinary cooperation.

Resume

Eesti noorsootöö täiustamise viise parimate suurandmete praktikate näitel

Käesolev magistritöö püüdis teoreetiliselt rikastada olemasolevat kirjandust ja arusaamist suurandmete analüüsisi ja tehisintellekti fenomenist noorsootöös. Noorsoopoliitika kujundajad ja rakendajad Eestis on hakanud huvi tundma suurandmete kasutamise vastu. Peamine magistritöö eesmärk oli tõsta teadlikkust noorsootöö ja suurandmete võimalikust vastastikusest seosest, nii et see jõuaks avalikkuseni, st nendeni, kes teevad igapäevaselt noorsootööd ja IT-ekspertideni, kes pakuvad lahendusi. Täiendav eesmärk oli uurida suur andmete ja tehisintellekti potentsiaali noorsootöös.

Käesolev töö andis teoreetilise ülevaate noorsootöö hetkeseisust ja võimalikest kokkupuutepunktidest tehnoloogiaga. Et uurida teemat rohkem algallikatest viidi läbi intervjuud noorsootöö ja IT-sektori ekspertidega. Magistritöös leiti vastused põhiküsimustele.

Selle magistritöö tulemusena on paremad võimalused edasisteks uuringuteks ja hüpoteeside seadmiseks. Sellest uurimistööst saadud teadmised esitatakse Eesti Noorsootöö Keskusele ja ettevõtetele, kes olid antud teemast huvitatud magistritöö koostamise ajal. Vastused uurimisküsimustele annavad esialgse arusaama selle kohta, millist arvamust omavad selle teemaga seotud eksperdid.

Et noorsootöö valdkonnas aktiivsed inimesed võivad osutada sektori probleemidele ja mõned neist teavad ka kuidas esitada "õigeid küsimusi", mis viivad vastuste ja lahendusteni, on teistes valdkondades inimesi, kes võivad pakkuda vajalikke lahendusi. Seetõttu on oluline tõhustada erialade vahelist koostööd.

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Appendix 1. Selection of current issues in youth work field

Can You think of any big data analyze (or artificial intelligence) related solution for helping along solving any of the following current problems of youth work sector in Estonia?

- There are a lot of young people who are neither working nor studying. There are different programs created for them, but it is very difficult to reach them, because they are inactive and do not get in touch with youth workers.
- Youth workers have to spend too much of their work time on data entry, because different sponsors demand the filling out of different forms (about youth participation)
- There is a lot of good quality youth information (about health, studies, work, free time, etc) available online, but it is divided between different sources and therefore young people say that it is difficult for them to reach this information. They wish there was one source for all of that information, but youth organisations think that it would be difficult to maintain such a big source, because they should update it every day besides updating their own web page/app.
- Youth work experts want to increase the social participation of young people, especially participation in politics. Therefore an interactive platform should be created where they can participate and express their opinion (also anonymously).
- Career counselling – is there any way to improve the quality of personality tests?
- Depression, stress, and bullying at school – how to reach the ones who need help? How to could campaigns changed to be more effective for target groups?
- Youth excluded from society (the ones with fewer opportunities, disabilities and special needs) – is it possible to analyse their behaviour and actions somehow with big data? The experts consider understanding youth problems essential for approaching those youngsters personally and for decreasing their exclusion.
- There is no good working solution now which would help young people to give sense to what they learned from youth work, so that they could present it to someone later (for example to the employer).

- There are different databases about youth and their families, but they are divided between different organisations (such as police, child defence, youth worker, social worker etc) and they are not accessible to each other, so some of the data is duplicated.
- Youth workers do not have a good overview of what their colleagues in other organisations are doing. Because of that it seems that different activities are being repeated by different organisations and that makes them compete for youngsters' attention. In fact they would prefer to cooperate, but they say that they are too busy to keep up with all the news.
- There have been attempts between the youth work and agriculture sectors to propagate rural life. After several campaigns, both sides were satisfied with the outcomes, but it has not become a regular collaboration, because the two sides do not make regular contact with each other or they might not even come up with the idea to cooperate.
- Is it possible to investigate the data (from before their leaving date) of youth who have emigrated? Maybe there are some patterns emerging which can be considered while planning youth services?

Appendix 2. Interview questions

- What do/did You do related to big data at your work?
- Why should the public sector be interested in finding ways to use big data?
- Do You have any idea how big data could help solve problems in youth work policy (including social, labour, health, culture, family and criminal prevention policies)?
- Which countries or companies would You choose as a good example to others? Do you know of any failure or unfortunate case of using big data?
- Do you criticise big data analysis? If yes, then why?
- What kind of technological solutions are you missing at your work?
- What are the possibilities for using technology in youth work?
- What are the limitations or restrictions for using technology in youth work?
- How is youth workers' professional education enabling them to consume and offer technology-based services?
- What do You think are the attitudes of youth workers and youth policy designers towards using technology in youth work?

Appendix 3. Interviewees

- A – scientist experienced in youth-related studies;
- B – youth work officer;
- C – from a youth organisation;
- D – from a youth workers' organisation;
- E – related with open data who works for a foundation;
- F – employed by Google – Senior Data Scientist and Machine Learning Engineer;
- G – Proekspert – Data Scientist;
- H – Swedbank – Software Developer and start-up entrepreneur;
- I – former Network Engineer – Microsoft
- J – Geonni Enterprise LLC – Data Scientist