Crowdsourcing Project as Part of Non-formal Education

György Molnár(✉) and Zoltán Szűts

Department of Technical Education,
Budapest University of Technology and Economics, Budapest, Hungary
molnargy@eik.bme.hu, szutszoltan@gmail.com

Abstract. Crowdsourcing is the latest revolution brought by the digital technologies of computing and communication. It is a nowadays popular way of finding services, concepts, or content by asking contributions from a large group of people, particularly from users. According to Jeff Howe, crowdsourcing generally refers to the participatory online activity of calls for individuals to voluntarily undertake a task. The key elements of a crowdsourcing project are the open call format intended for an enormous network of potential contributors. It is a revolution that brings people together and harnesses their collective intelligence. Crowdsourcing in an online, distributed problem-solving model that pulls the collective intelligence of online communities to assist explicit goals. Online communities, or crowds, are given the opportunity to answer to crowdsourcing activities requested. In crowdsourcing, there is no clear frontier between the subjects of a research and the researchers themselves. It differs from traditional outsourcing as it involves a random, volunteer crowd and not previously selected group of individuals. A crowdsourcing - along with big data and citizen science – is a key part of an important scientific, methodological and educational phenomenon. With advent of crowdsourcing, a paradigm shift can be witnessed in information procurement, transfer, storage and processing as well as in learning. In the practice, crowdsourcing forms a firm bond with the phenomenon of wisdom of the crowds and user-generated content.

Keywords: Crowdsourcing · Non-formal education · Waze · Wikipedia

1 History and Clarification of the Terminology

Creation of the Oxford English Dictionary in the 1800s is the initial example of crowdsourcing that can be used in non-formal education. Over an open call, public were asked to gather English words and their usage and show them to editors to be indexed in the dictionary [6]. Throughout history we can find open calls for solutions to solve tough tasks. Though crowdsourcing has a long history, it has really surfaced as a paradigm-shift phenomenon based on the tools of the Internet. When addressing crowdsourcing, the term fundamentally refers to crowdsourcing involving online technology [8].

M. E. Auer et al. (eds.), *Teaching and Learning in a Digital World*,
Advances in Intelligent Systems and Computing 715,
https://doi.org/10.1007/978-3-319-73210-7_107

1.1 Information Society

Authors would also like to look at the context, which made possible for crowdsourcing to become such an important phenomenon, the information society. As we all know, information society is a culture where the formation, dissemination, use, incorporation and management of information is a substantial activity.

According to György Csepeli and Gergő Prazsák, information society comes into being where broadband internet, capable of symmetrical connections is present both in physical and social space [2].

1.2 Web 2.0 and Crowdsourcing

Another phenomenon related to crowdsourcing is Web 2.0. Web 2.0 services permit users to cooperate and collaborate with each other as creators of user-generated content online, in contrast to Web sites where people are limited to the passive viewing of content. Web 2.0 services are the most known social networking sites (Facebook), blogs (Twitter, Wordpress), wikis (Wikipedia), folksonomies, video sharing sites (YouTube), hosted services and tags [7]. One of the most notable effects that mark Web 2.0 are not the services but the ways that ICTs have restructured the interaction. Government, businesses, NGOs and schools frequently the power of online communities for routine procedures [3].

1.3 Collective Intelligence and Wisdom of Crowds

Pierre Lévy defined collective intelligence as a "form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills" [5]. James Surowiecki defines the phenomenon "wisdom of crowds," as where, under the right conditions, groups of people can outperform even the best individuals or experts. Surowiecki claims that the wisdom of crowds is based on the freedom of entities in a group, the multiplicity of the group, and the combination of their individual productions rather than the averaging of their cooperative effort. With diverse individual and/or group skills, people will give varying connotations to a single detail or inquiry [9].

1.4 Crowdsourcing

Crowdsourcing is also a way of cooperation, accumulation, collaboration, agreement, and originality. A new way of doing work, but it also is a phenomenon where clusters of people can outdo individual professionals, outsiders can bring different visions to internal problems, and geographically isolated user can work together to create policies and proposals that are agreeable to most.

Crowdsourcing means access to talent: Many people crowdsource to get access to talent that they can't get in any other way. Crowdsourcing can help find individuals who have special skills. It can also bring you the talent that comes from the collected intelligence of the crowd, the ability to do things that are difficult for machines to do.

1.5 Five Categories of Crowdsourcing

Government Crowdsourcing
The subcontracted actions are those handled by government institutions that provide constant support to certain categories or whole population. This assistance might be health or wellbeing associated, emotive, material, etc.

Business Crowdsourcing
Business crowdsourcing platforms are a meeting place for institutions offering work and those looking for contracts. The businesses promoting work are characterized by offering ventures that can be fragmented down into simple tasks; these ventures, then, are complicated but not complex.

Ngo and Non-profit Crowdsourcing
Crowdsourcing enables NGOs to hire people with specialized skills on a short-term basis or to use inexpensive services that provide the skills they need.

Cultural Crowdsourcing
Cultural crowdsourcing motivate the public to take on tasks that cannot be done mechanically, in an environment where crowd's input contributes to a common, substantial goal or research interest. Crowdsourcing can be vastly effective for engaging audiences with the work and assortments of galleries, libraries, archives and museums.

Scientific Crowdsourcing and Citizen Science
Citizen science are projects conducted, in whole or in part, by amateur or nonprofessional scientists. It is also a non-formal educational method.
But citizen science is not about amateurism. Based on a survey of 320 participants in the InnoCentive "solver" community, Karim R. Lakhani and colleagues found that solvers were "highly qualified," with 65% of solvers holding doctorates and nearly 20% holding some other advanced degree, mostly degrees in the sciences [4].

2 Example of Non-formal Educational Crowdsourcing Project

Meteorologists have found great value in the log books of the British Royal Navy, which contain one of the most complete records of global weather data. The logs of the British Navy are handwritten, and no computer can scan them successfully. Examples include: 'Pistols explode,' 'Seamen abscond with dinghy,' and 'Prayer services held.' Even the best programs may not realize that these events had anything to do with the weather (Fig. 1).

For each task, the crowd is shown a single page of a ship's log. When they see something of interest on the page, they're supposed to move the cursor to that point and click. The Zooniverse interface then opens a little window, which allows the worker to transcribe the information. The boxes for weather data have specific fields for wind, temperature and barometric data.

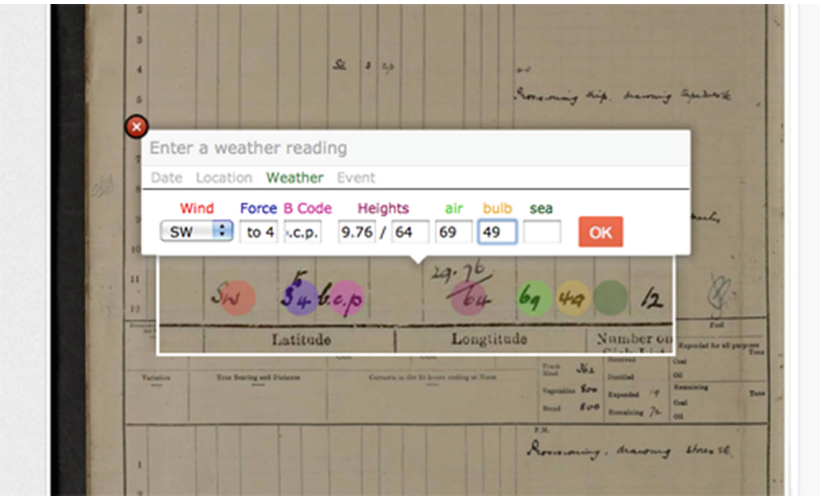

Fig. 1. Old weather

2.1 Knowing the Limits

We have to notice that not everything can be crowdsourced. You should not crowdsource in education if:

- Sometimes, crowdsourcing does not bring in the talent you need. You cannot always find the talent that you need in the crowdmarket.
- Crowdsourcing hurts quality. Crowdsourcing can easily lower the quality of your "product". This kind of problem often occurs when you do sophisticated things that need to be monitored constantly.
- Crowdsourcing makes things too complicated. If you need to give more to crowdsourcing than the benefits you get back from it, you should not crowdsource.
- Nevertheless its very rare, there is always some vandalism in crowdsourcing, for example in Wikipedia.

2.2 Non-formal Teaching and Learning – the Use of Waze and Wikipedia

There are several crowdsourcing projects that can be used in education. In the survey two of them will be enquired. Waze a GPS navigation software that works on smartphones and tablets with GPS support provides real time information on traffic. Some of this information (for example traffic jams and accidents) is provided by users, and the same time it is immediately used for process of learning. During this process drivers learn about actual traffic situation and through this knowledge, decide on their further actions. Seeing the popularity of the application, it can be suggested, that education systems ought to be more like crowd-sourced apps, especially Waze [1]. They must draw on the knowledge of those using it to adapt and become more relevant. This education should offer customisable experiences and real time application of knowledge. And the educational systems should create a platform for collaboration [6].

Wikipedia a great example of crowdsourcing, where it can be immediately used for learning. The most commonly critic is that the Wikipedia's inaccurate material is incomplete not valid. It is based on the fact that its content is not created in a traditional publishing environment, with professionals and editors. Wikipedia is being written and edited by individuals with different motives and can be authored by any internet user.

3 Empirical Survey

In this chapters the authors will introduce a survey conducted at Budapest University of Technology and Economics. As a measuring instrument we used the quantitative questionnaire survey method, using simple random sampling from a student base population. The survey was conducted in May 2017, where N = 59 evaluable answers were received. The majority of the chosen target group were correspondent vocational teachers, which means engineers and economics teachers. The results of the questionnaire test were performed using textual and diagrammatic processing using a simple descriptive statistic method. The questionnaire contained a total of 16 questions, of which the authors in answers included only more relevant ones. Most of our respondents (53%) were male and minority (47%) female students. Most of the target group were an engineer and economy teachers, this explains the gender distribution (Fig. 2).

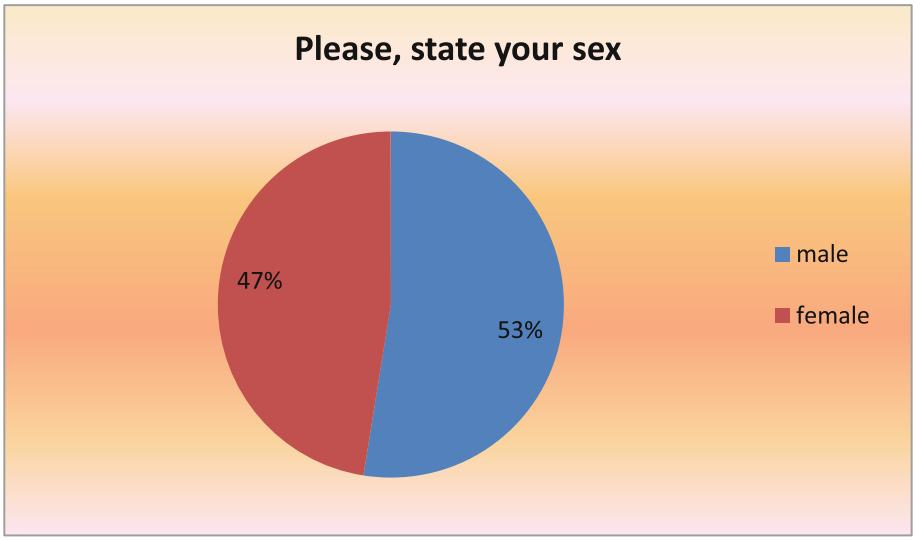

Fig. 2. Repartation of gender, own diagram

Most of the respondents, 38% were people aged 41–50, this is the X-generation, the digital immigrants. Nearly one third of the respondents, 28% were aged 31–40, they are members of the Y generation, who are more of a digital natives. 20% of respondents were aged 51–55, they belong to the baby boom generation, while 7% are 56–60 years old.

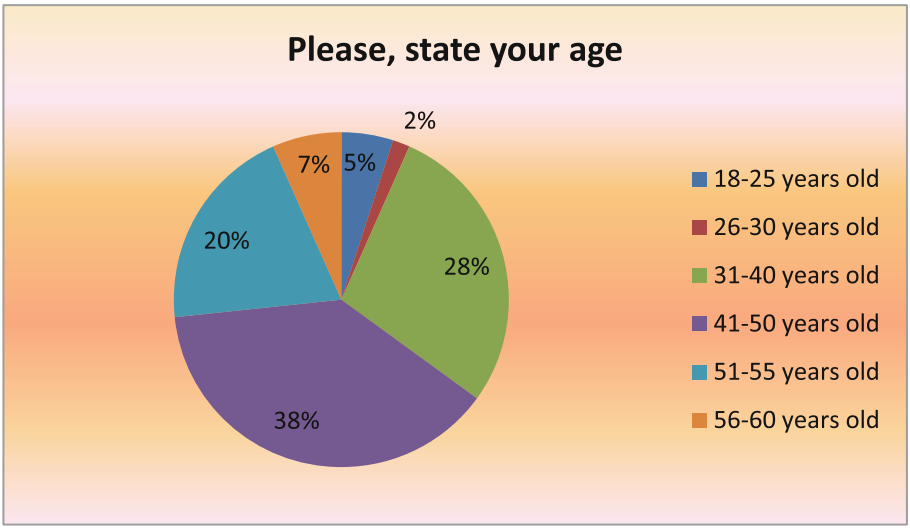

Fig. 3. Repartation of age, own diagram

Overall, a broad spectrum is shown by the age group, and the majority of the elderly respondents can be explained by fact that they attend correspondent training (Fig. 3).

All the interviewed used to download digital content from the Internet. The frequency distribution of this is shown in the following figure, where we see that the vast majority of respondents (57%) use to download of digital content every week. This is 21% download daily, and 14% monthly (Fig. 4).

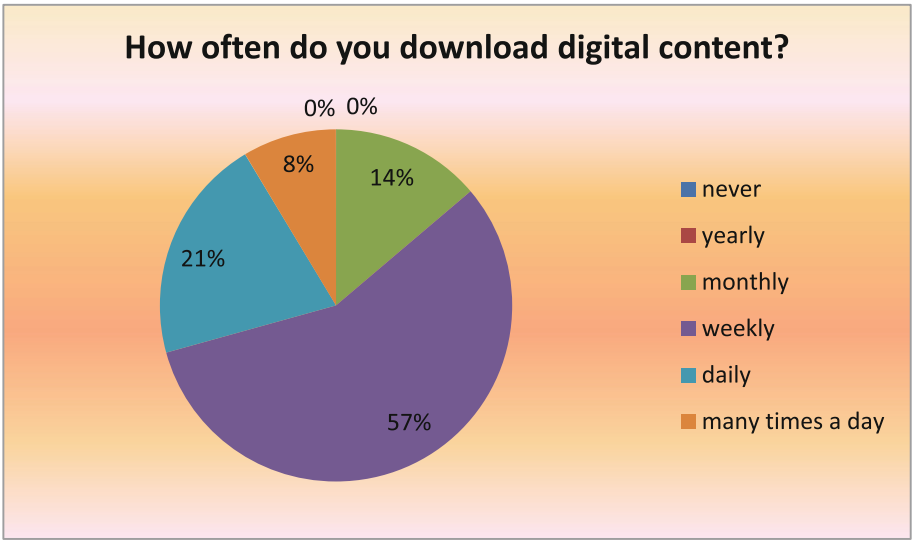

Fig. 4. Repartation of frequency of digital content materials, own diagram

Almost half of the respondents, 47% do not know the Waze mobile navigation application, which is a striking practical example for crowdsourcing. Only 35% use it, and 18% did not answer (Fig. 5).

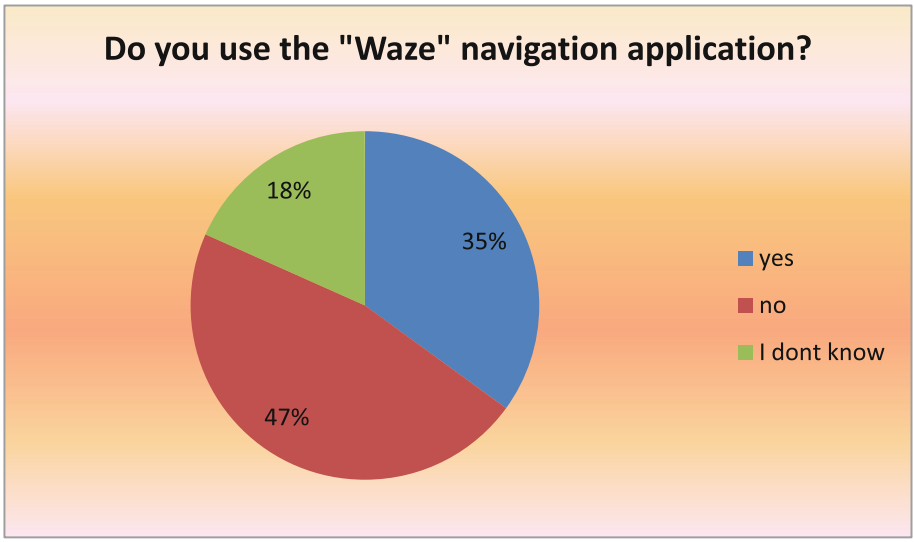

Fig. 5. Repartation of use the "Waze" navigation application, own diagram

The following diagram shows that 98% of respondents use the most popular crowdsourcing application, Wikipedia. This is a welcome fact, especially if we look at the age of affliction. There is no one who does not know it (Fig. 6).

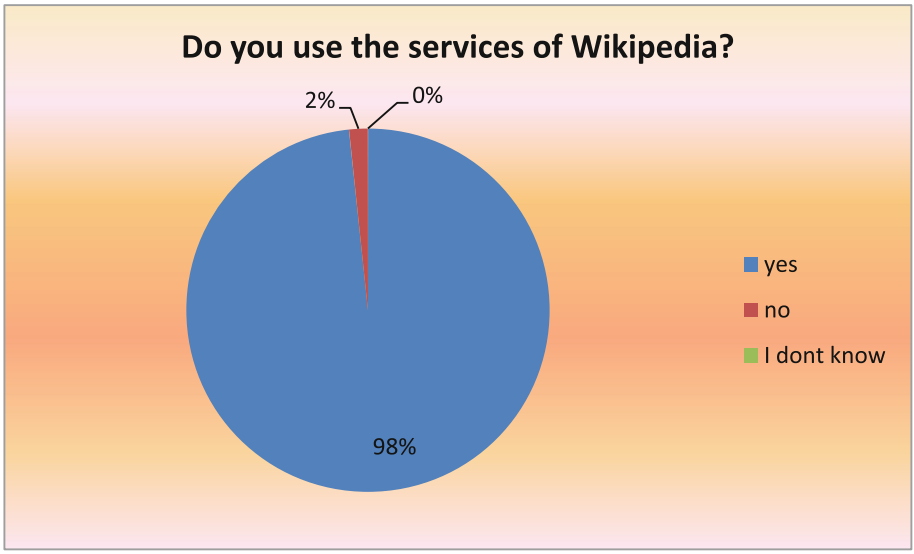

Fig. 6. Repartation of use the services of Wikipedia, own diagram

In the following diagram it is presented that, Wikipedia's services are used by 46% of the respondents per week, 25% each month, and 17% only yearly. This is essentially a sign of an advanced digital culture, but 100% of respondents use Wikipedia only as content consumers, just for collecting information (Fig. 7).

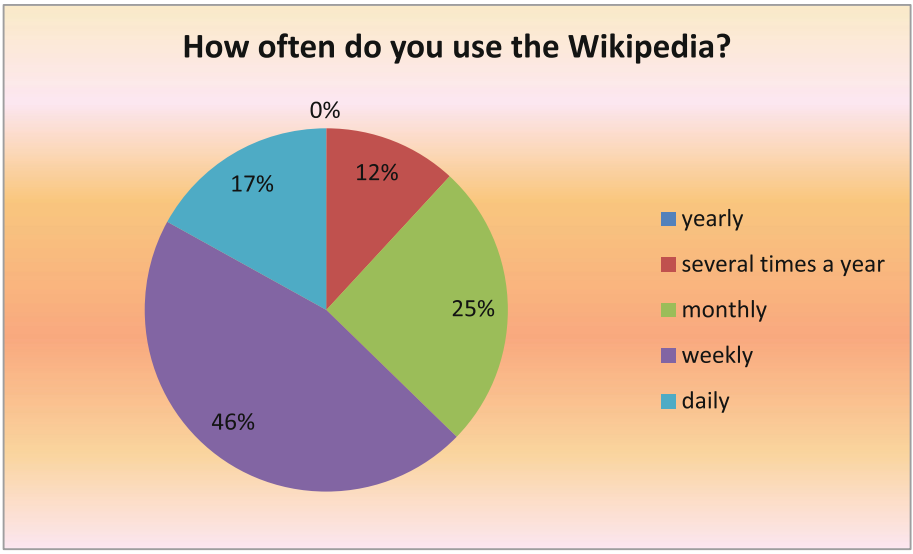

Fig. 7. Repartation of frequency of use of Wikipedia, own diagram

The following figure shows the use of Wikipedia. It shows that the majority, that is, 55 respondents use Wikipedia only as source of information. 19 people use it in education (Fig. 8).

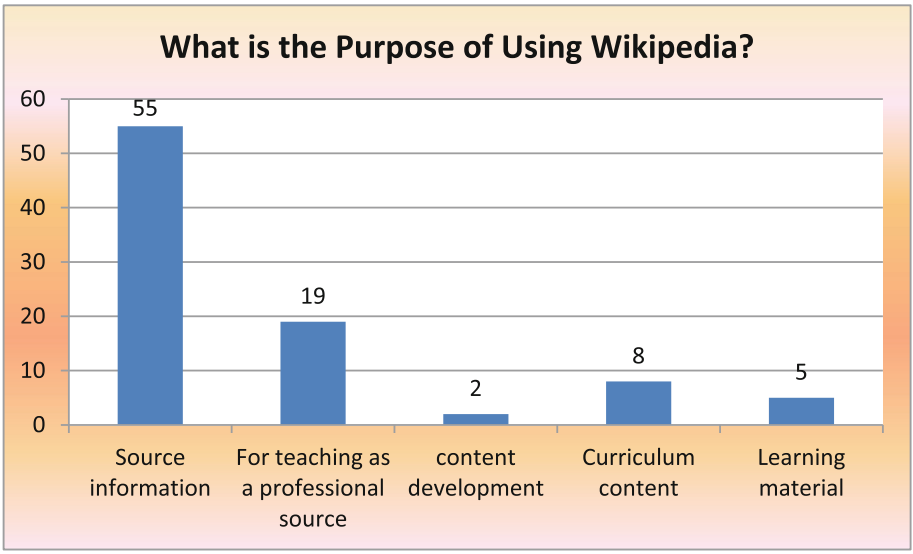

Fig. 8. Repartation of Purpose of Using Wikipedia, own diagram

More than half of the respondents, 52%, would like to share the content created in Wikipedia (Fig. 9).

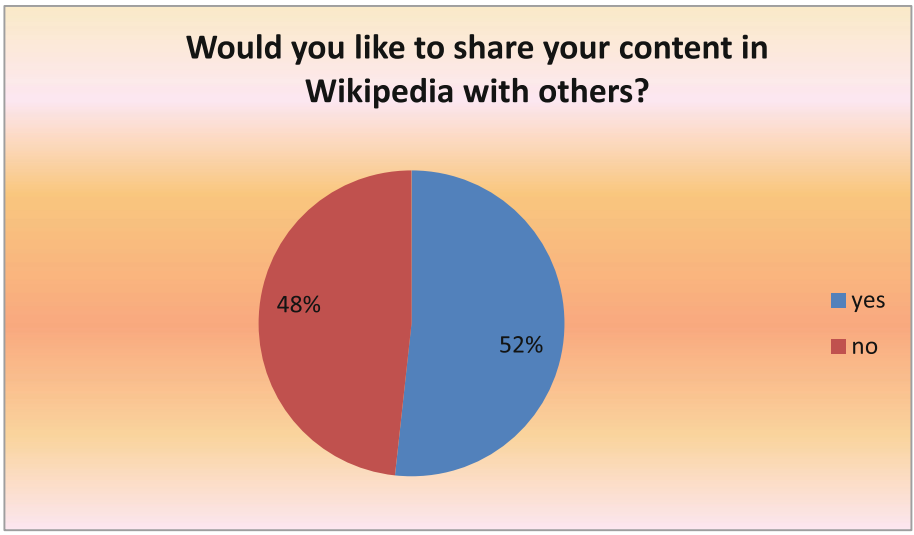

Fig. 9. Repartation of content to share in Wikipedia with others, own diagram

75% of all respondents fully, while 18% more or less believe it to be important for content produced in the Wikipedia to be accessible to the open community (Fig. 10).

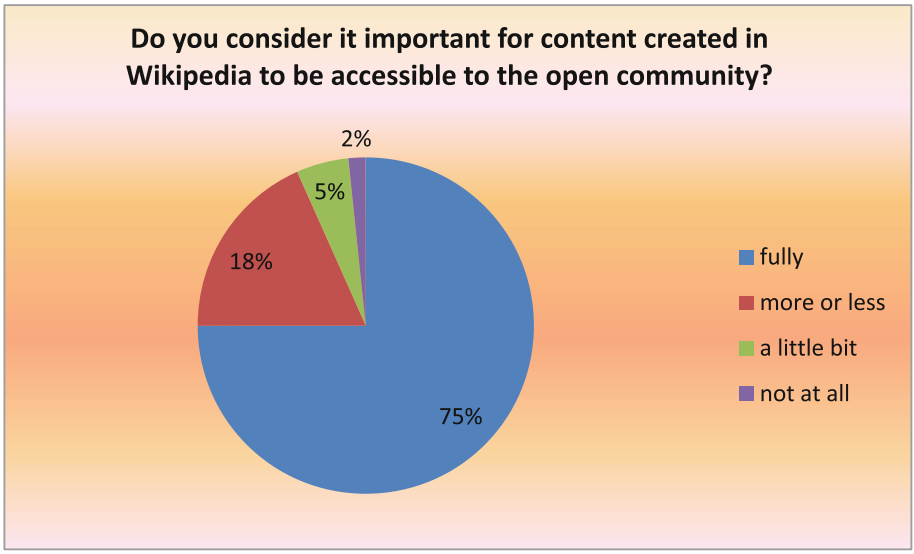

Fig. 10. Repartation of content to share in Wikipedia for open community, own diagram

Almost half of the respondents consider the Wikipedia services to be of little importance, while 38% of them consider it very important (Fig. 11).

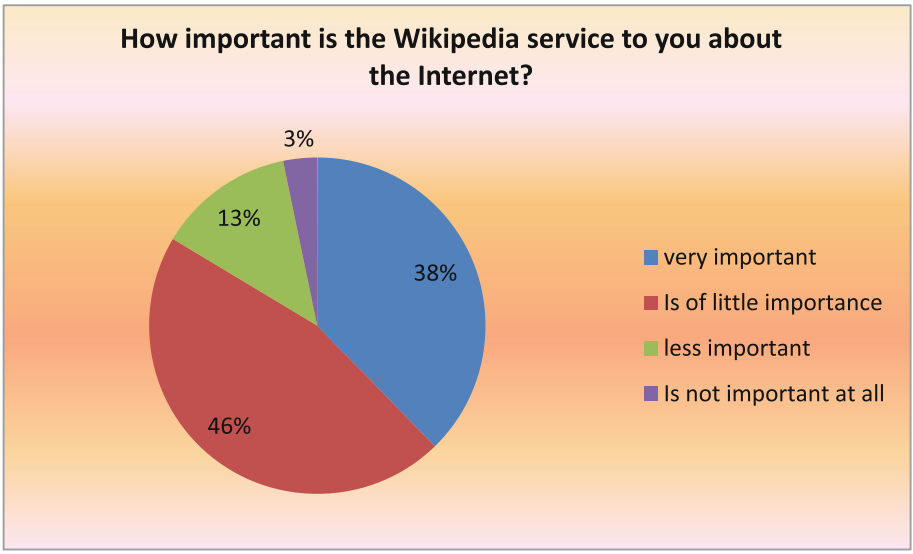

Fig. 11. Repartation of role of Wikipedia in Internet, own diagram

A Proposal for a Genealogy Research Project

- Genealogy research in crowdsourcing model
- A Hungarian genealogical tree from 1900
- Unified, open source, editable Web 2.0 database
- Dedicated editors
- A graph editor
- Data mining from offline databases
- Using oral history methods
- Users with free capacity map uncharted parts
- Word-of-mouth marketing.

4 Conclusion and Future of Crowdsourcing

What can be the future of crowdsourcing: There will be interdisciplinary collaboration between the scholars. Crowdsourcing will be part of non-formal educational system. Crowdsourcing seems a natural approach to processing big data. And maybe, professional crowd will arise.

Based on the method and the empirical study presented in this article, the difficulty of the method is that a large amount of unstructured data from the entire Hungarian online public has to be analyzed in a given time interval.

It is a help that the audio and video content is beyond the survey's horizon, so it is only necessary to concentrate on textual, Hungarian-language content. The upside of the method is that no special, costly IT infrastructure is needed. Similarly, the data comes directly from the students and it is not hindered by filters like hypothesis, questionnaire, questioner.

References

1. Benedek, A.: New educational paradigm: 2.0: items of digital learning. In: Benedek, A. (ed.) Digital Pedagogy 2.0., pp. 15–48. Typotex, Budapest (2013)
2. Csepeli, G., Prazsák, G.: Örök visszatérés? Társadalom az információs korban. Jószöveg Műhely Publisher, Budapest (2010). ISBN: 9789637052934
3. Molnár, G.: The impact of modern ICT-based teaching and learning methods in social media and networked environment. In: Turčáni, M., Balogh, Z., Munk, M., Benko, Ľ. (eds.) 11th International Scientific Conference on Distance Learning in Applied Informatics, pp. 341–351 (2016)
4. Lakhani, K.R., Panetta, J.A.: The principles of distributed innovation. Innovations **2**(3), 97–112 (2007)
5. Lévy, P.: Collective intelligence: Mankinds Emerging World in Cyberspace. Published by Plenum Trade, New York (1997)
6. Eskenazi, M., Levow, G.-A., Meng, H., Parent, G., Suendermann, D.: Crowdsourcing for Speech Processing: Applications to Data Collection, Transcription and Assessment. Wiley, Chichester (2013)
7. Siemens, G.: Connectivism: a learning theory for the digital age. Int. J. Instr. Technol. Distance Learn. **2**(1), 3–10 (2005)
8. Surowiecki, J., Silverman, M.P.: The wisdom of crowds. Am. J. Phys. **75**(2), 190–192 (2007)
9. Szűts, Z., Jinil, Y.: Recent problems of digital culture. Value of incomprehensible. Információs Társadalom **2014**(1), 109–116 (2014)