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Methodological Approaches to Study of Interactivity in Communication Journals

Abstract

The aim of this paper is to map out the research around the concept of interactivity, as well as to point out the dominant streams and under-researched areas. It is based upon the content analysis of methods employed in articles published in five top-ranking communication journals over five year period (2006-10). The review of methods applied in research of interactivity is based upon distinction between social interactivity, textual interactivity and technical interactivity. This classification is further developed by adding the category of levels of interactivity (low, medium and high) which allows further classification of different mediated practices. This leads to specification of nine theoretical subsets of interactivity as the main categories of the analysis of research articles. Within this matrix we have situated diverse methods that respond to conceptually different types and levels of audience/users interactivity. The analysis shows that scholarly focus lies within the low textual and the high social interactive practices, whereas the high technical and high textual interactivity are under-researched areas. Investigations into the audience/users relations with texts are mainly orientated towards content analyses and surveys. High social interaction research is reviving the application of ethnographic methods, while the possibilities of technical interactivity are embraced not as an object but as a tool for research.

Keywords

Interactivity, digital communication, research, methods, journals. top-ranking, papers.

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1. Introduction

The advancement of communication technologies brought about new modes of communication in the public domain, new paths and fluxes of messages' intersections, transforming the linear model into what Gunter (2003) summed up as a one-to-one, one-to-many, many-to-many and many-to-one model of public communication. The transformation of communication technologies «empowered» the previously passive audience with tools to alter/collaborate in creator content, involve/pace social interaction with the author/audience and to take part in the technological or architectural structure of media by producing new/unlocking present digital codes. Interactivity, although a highly contested concept in media and audience studies, becomes rather useful for interrogating the roughly sketched transformation of the communication social system and of the audience as its inherent part.

This article will view interactivity as *differentia specifica* that exceeds and encompasses changes that shape the new media ecology. Its aim is to map out the research around the concept of interactivity, to point out the dominant streams and under-researched areas and to situate diverse methods that respond to conceptually different types and levels of interactive practices.

2. Concept of Interactivity

The starting obstacle in investigating interactivity is the problem of circumscribing and operationally defining the concept. Although it has been in focus for almost three decades now, even the recent scholarly examination of interactivity starts with concept explanation (Sohn, 2011; Koolstra & Bos, 2009; Rafaeli & Ariel, 2007; McMillan, 2002; Kioussis, 2002). A review of previous research shows that the obstacles can be placed in three groups:

First, the concept is theorized and used in a multitude of disciplines ranging from computer science, information science, advertising and marketing to media studies. Therefore it is defined from numerous perspectives.

Second, there is a difference between feature-based versus perception-based interactivity. Different authors defined interactivity either as a structural element of the medium (Manovich, 2001), or as a perception variable in the mind of the user (Wise, Hamman & Thorson, 2006). In the context of this article we will avoid this dispute by arguing that actual interactivity cannot be strictly contrasted to perceived interactivity as a psychological state experienced by the user. Or as Rafaeli and Sudweeks (1997, cited in Cover, 2006: 141) state, interactivity is not a characteristic of the medium, but a process-related construct about communication.

The third is the dimensional character of interactivity. The multidimensionality of the concept was variously determined by interrelations between: frequency, range, and significance; direction of communication, user control, and time; speed, range, and facilitating users' manipulation of contents; or by degree of sequential relatedness among messages (Jensen, 1999).

Szuprowicz (1995) introduces a more unified approach and identifies three dimensions of interactivity: user-to-user, user-to-documents, and user-to-computer (user-to-system). This approach can be a good starting point for further exploration of the interactivity because it examines audience relations with three crucial components of every mediated communication – content, other participants and technology. Furthermore, the conceptualization of interactivity through these three dimensions leads to a framework that is inclusive of many different perspectives and approaches, and provides a rather large umbrella needed for this research. Having that in mind we take up the presented dimensional treatment of interactivity which we will label:

- Social interactivity (interaction among users).
- Textual interactivity (interaction between user and documents).
- Technical interactivity (interaction between user and system).

Another contested issue in the media theory and research is the degree or level of interactivity. Essentially, there is a question of how much interaction with other users, texts and systems can be achieved. First Kayany, Wotring and Forrest (1996) and later McMillan (2002) suggest that users exert relational (or interpersonal), content (or document-based) and process/sequence (or interface-based) type of control. Although in McMillan's framework the level of control is not the only dimension of interactivity, it is the only one relevant to all types of interaction.

In line with these arguments, we propose that interactivity, defined as control over text, social interaction and medium, can be subdivided into three levels: low, medium and high, defined by the control users are able to exert. This means that within each type of control, different degrees can be identified and analysed.

If we think about interactivity as a continuum of different practices, the activity of the audience as recipients in classical mass communication flow would be at the lower end, while actions similar to those of producer or participant in interpersonal communication would be at the opposite, high side. In some practices, the audience does not have the possibility to control any of the three dimensions of interactivity. For example, they cannot initiate communication, alter text, or influence other participants in communication. We argue that this is not a situation of zero control because even in the typical mass communication situation, audience members can stop the communication or interpretatively control media texts. These low levels of interaction are seeds of what will grow into higher levels of audience control (Cover, 2006).

The medium level of interactivity refers to the activities in which the audience exercises control, but within pre-given parameters and rules. In terms of social interactivity, this means that authors have envisaged and provided channels for users to respond and maintain interaction. The textual medium interactivity is typically related to those situations in which users are invited to actively participate in the construction of media content. In the case of technical interactivity, medium control should be seen as producer provided opportunity to participate in the co-construction of some parts of media architecture. The high level of in-

teractivity assumes freedom achieved by the users themselves, contrary to the desired level of control which the producer-creators want to keep.

The Intersection of the outlined dimensions of interactivity with the additional levels of control (Table 1.) assembles the theoretical model of interactivity which will be used in this article to investigate trends and methods employed in communication research.

Table 1. Types and levels of interactivity			
	Textual	Social	Technical
Low	'Reading' the text, with no possibility of changing it: Typical mass communication	Centre-to-many, many have no control over interaction: Para-social interaction with 'author'	No manipulation of media architecture: Classic mass communication model
Medium	Co-creation of text, based on the selection of the already available items: Browsing through hyper-texts, making narrative choices	Centre-to-many, many have the possibility to partially control the interaction: Some genres and forms of typical mass communication (live program, in program texting, audience 'comments')	Manipulation of media architecture within the pre-given limits: Adjusting settings, customization
High	Co-creation in which the text is the product of multiple users: Wikipedia, modifying gaming texts	Public communication of many-to-many who have equal control over the interaction: Forums, Wikimedia	Manipulation of media architecture beyond the given limits: Changing video game codes

3. Method

The selection of the communication journals for any study is faced with one general and one subject specific problem. The general problem is related to the controversy around journal evaluation, in scientometrics and academic circles. After decades of prevalence of the journal impact factor (JIF) applied to the journals from the Web of Science data base, in the last ten years new methods have started to emerge (e.g. h-factor (Braun & al., 2006), Eigenfactor™ (www.eigenfactor.org), Article-Count Impact Factor (Markpin & al., 2008)) and others. However, there is no agreement on the common method as all of them favor some and neglect other journal characteristics (Bollen & al., 2009). Aware of its limitations, we still opted for JIF as the criteria for inclusion as it is most commonly used in the analysis of communication journals (Feely, 2005) and because it is widely used by promotion and grant review committees (Kurmis, 2003). Journals with higher JIF will be more frequently read, used and cited and, as such, they set trends in research.

Journal Citation Report (JCR) of the Web of Science, the last report available at the time of research, included 55 journals in the Communication field for 2009. The subject specific problem with this list is that it reflects diversity of intellectual traditions and atomization of research domains within the communication scholarship. In order to capture a wider array of interests in the field we have

selected the journals which, according to Park and Leydesdorff (2009), fall into the ‘sector of communication research’. Among the first ten highest ranking journals (based on their JIF), those were Journal of Communication (IF 2.415, ranking: 2/55), Human Communication Research (IF 2.200, ranking: 3/55), Communication Research (IF 1.354, ranking: 8/55) and New Media and Society (IF 1.326, ranking: 10/54). General psychology and health-related psychology, as two other primary sectors among communication journals (Park & Leydesdorff, 2009: 169), were excluded. An exception from this criterion was made with the Journal of Computer-Mediated Communication (IF 3.639, ranking: 1/55) because it was first on the JCR for 2009, it is published by the biggest communication research association ICA, and, most importantly, because its thematic scope promised research in computer-mediated interactive forms. To achieve a representative sample for analysis of trends and methods we analysed papers published during a five-year period, between 2006 and 2010.

In selecting the sample of articles, standard bibliometric research through key words proved insufficient, as in some papers interactivity was not explicitly mentioned, although some aspects were investigated. We included papers which took interactivity into account as an element of the communication process, with or without explication of the term. Second, we were interested in the articles presenting empirical research, because the aim of this paper is to provide insights into methods employed for different types and levels of interactivity. The third criterion was that the object of analysis is public or semi-public communication. In line with the proposed typology, we decided to preserve the minimum condition of «audiencehood», although acknowledging the change indicated by the new terms such as consumers and users. Using these criteria, 98 articles were selected for further analysis

We analysed the content of selected papers using NVivo9 as a software tool. Dependent variables of the code were types of interactivity (social, textual, technical) and levels of interactivity (low, medium, high). Coding was done by the authors. To develop precise definition of variables and resolve dilemmas authors thoroughly discussed 10 articles that were included in inter-coder reliability sample. Additional 40 papers were subject to inter-coder reliability testing. The discrepancies were resolved by simple majority rule (2 of 3) and these 50 papers became part of the full sample. Since inter-coder reliability, calculated using average pairwise per cent, was 0.93 (Table 2), the remaining 48 articles were coded independently.

Table 2. Inter-coder reliability values

	Social Low	Social Medium	Social High	Low Textual	Textual Medium	Textual High	Technical Low	Technical Medium	Technical High
Agreement percent	0.97	0.93	0.92	0.94	0.9	0.93	0.97	0.91	0.97

For the frequency of methods employed in empirical research we adopted a slightly different approach. Using NVivo software we coded information on the

methods as they appeared in the articles. Since this information is explicitly provided, the nodes and sub-nodes for each method were added as it appeared in an article.

4. Findings

Within 98 analysed articles, the majority of papers are published in the Journal of Computer-Mediated Communication, New Media and Society and Communication Research (Table 3). No significant trend can be traced when it comes to research interest into different types and levels of interactivity, at least not in the five year period (Table 3). However, our sample shows that there is a constant interest into interactivity in general, since the article distribution per year varies only 6%, from the lowest 17% in 2006 to the highest 23% in 2007.

	2006	2007	2008	2009	2010	Total
Journal of Computer-Mediated Communication	5	9	5	3	6	28
Journal of Communication	4	5	1	3	1	14
Human Communication Research	0	3	2	1	4	10
New Media and Society	2	4	9	6	5	26
Communication Research	7	2	4	4	3	20
Total	18	23	21	17	19	98

Authors are interested in the low textual and the high social interactivity, while it can be observed that technical interactivity is an under-researched area (Table 4). There are only two articles in which all types of interactivity are accounted for. In terms of methods, they present survey based research interested in general usage of the features of web communication. There are further 12 articles in which two types of interactivity are considered as important, and in majority of them (10 out of 12) it is a combination of social high and technical medium interactivity.

	Social			Textual			Technical		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
2006	0	0	7	7	1	1	0	4	0
2007	0	3	11	5	5	0	0	1	0
2008	0	2	13	2	2	3	0	2	0
2009	1	3	9	4	4	0	0	4	0
2010	0	1	8	6	5	0	0	1	0
Total	1	9	48	24	17	4	0	12	0

* The total number is higher than the number of articles, because in 14 articles there is more than one type of interactivity.

The Table 5 shows distribution of methods of research within the matrix of the types and levels of interactivity. In the next section we will discuss it further.

Table 5. Methods applied for different levels and types of interactivity

Methods	Social			Textual			Technical	Total
	Low	Medium	High	Low	Medium	High	Medium	
Survey	0	0	10	11	6	0	6	33
Online survey	1	3	8	7	2	1	2	24
Social network analysis	0	0	6	0	0	0	1	7
Q methodology	0	0	0	1	0	0	0	1
Content analysis	0	4	11	1	2	2	1	21
Experiment	0	1	18	10	10	1	9	49
Ethnography	0	1	6	0	1	0	0	8
Qualitative text/discourse analysis	0	0	9	1	3	0	1	14
Total	1	9	68	31	24	4	20	157

4.1. Textual interactivity

Classified under the subset of low textual interactivity are the papers in which researchers focus on text rather than audience activities. Activities with hyper-text and multi-narratives are considered as medium interactivity, while co-creation of the content is regarded as a highly interactive act. The researchers follow the dominant stream of communication research looking at content without audience involvement (Table 4).

4.1.1. Low textual interactivity

Media effects paradigm is a dominant theoretical framework in dealing with the low textual interactivity practices. Researchers are interested in: a) the effects of a particular type of media content (e.g. cosmetics surgery makeover program, entertainment TV organ donation stories) on audience behavior; and b) the impact of certain textual features (sources, narrative types, presentation, characters' gender) on the audience. The new media audiences are treated in low textual interaction, leaving aside the possibilities offered by the digital medium. For example, even computer games are researched as any other type of media content, without any acknowledgement of user role in creating narration or adjusting the settings (Ivory & Kalyanaraman, 2007; Williams, 2006).

Audience behaviour was also approached from the uses and gratifications perspective in order to research the particular aspects of media use, such as gratification in watching movies (Oliver & Bartsch, 2010), motives for participation in phantasy sport competitions (Farquhar & Meeds, 2007), or patterns of the use of a web site (Yaros, 2006).

Two methods dominate the research into the low textual interactivity – survey and experiment. While survey is used to gain knowledge about television and

new media audiences-users, the experimental design is almost exclusively applied in order to investigate the internet and gaming behaviour. The results indicate that in computer-mediated communication, novel ways to manipulate text in order to examine effects of messages emerge. This manipulation allows researchers to control textual features and examine audience responses with higher precision and certainty (Yaros, 2006; Knobloch-Westerwick & Hastall, 2006).

Qualitative research was rarely conducted and it is an exception from the dominant pattern. For example, Buse (2009) finds it the most appropriate for investigating how computer technologies relate to experiences of work and leisure in retirement, while Kaigo and Watanabe (2007) qualitatively analyse reaction to video files depicting socially harmful images in a Japanese internet forum.

4.1.2. Medium textual interactivity

Research into the medium textual interactivity is targeting new media, dominantly web sites and online forums, with two exceptions focusing on computer games. The audience activities that were attracting interests were information seeking, especially related to health issues (Ley, 2007; Balka & al., 2010), and hypertext reading.

Tracking user behaviour through web behaviour recording programs is the frequently used gathering technique in researching medium textual interactivity. Tracking is organized either in the natural setting of the users (Kim, 2009) or, more often, in laboratory controlled and generated conditions (e.g. Murphy, 2006; Tremayne, 2008). To provide additional information about the meaning of computer collected data, researchers need insight into the motives and intentions of participants. Surveys are often used for that purpose (Wu & al., 2010; Wirth & al., 2007; Kim, 2009), but talk aloud protocols or measurement of physiological responses in an experimental setting (Weber & al., 2009) are sometimes used instead.

There are also already established methods that were harder to achieve in previous media environments, such as gathering written narratives from the audience, by e-mails, forums and blogs. Also, content analysis is used to get insight into participants' selections and navigations while using a search engine (Wirth & al., 2007) or into gamers' behavior (Weber & al., 2009).

4.1.3. High textual interactivity

With only four articles, it seems that collaborative content creation is rarely within the range of researchers' interests. Two types of Wiki content are explored – Wikinews (Thorsen, 2008) and Wikipedia (Pfeil & al., 2006), both based on a content analysis of collaborative products, but not on the processes through which the content is co-created. Cheshire and Antin (2008) used the internet field experiment in order to research the correlation between the feedbacks that an author receives and her/his willingness to post again. Citizens' readiness to

incorporate their own content into local online newspapers was explored using online survey (Chung, 2008).

4.2. Social interactivity

For a long period of time social interactions were researched mostly from the perspective of sociology and psychology interested in unmediated interpersonal communication. Nowadays, this is a relevant topic for media studies, as new technologies enable interpersonal encounters in mediated settings. The boost of forums, social networks and similar social platforms caused significant interest among scientists and our findings confirm that. The majority of articles refer to the different aspect of practices that are labelled as high interactivity because they are the most similar to face-to-face communication which is the prototype of the highest possible interaction. The number of articles that belong to the category of medium social interactivity is more than five times smaller (see Table 3). Para-social interaction with the 'author' defined as the low social interactivity, is missing from the research. This is understandable because in the new media environment there is real, sometimes even high, social interaction with the typically distant communicators (celebrities, journalists etc.).

4.2.1. Medium social interactivity

Medium social interactivity is present when audiences have the opportunity to communicate with the authors of media content by sending comments or taking part in live programs, thus having partial control over the interaction. The shift from typical mass media audience to blog audience is evident and logical, because the medium social interaction is embedded in the definition of the blog. The behavioural patterns and attitudes of blog users were researched using online surveys (Sweetser & Kaid, 2008; Kelleher, 2009). The use of online journal style web log was an object of a case study, which included long term participant observation and in depth interviews (Hodkinson, 2007).

Content analysis of comments on blogs, news sites or YouTube is rather vivid in this area of research, so text is used as an indicator for the medium level of social interaction (Robinson, 2009; Antony & Thomas, 2010). Compared to the traditional content analysis, the scope of the mentioned studies has increased significantly. For example, employing semi-automatic methods to detect frequency of certain words during crisis, Thelwall & Stuart (2007) used evidence from postings blogs and news feeds. Online posts were also used to assess the salience of different opinion frames with that of different media frames, as in agenda-setting research (Zhou & Moy, 2007).

Similar to manipulation of texts, there are social experiments in creating blogs and observing participants behaviour. For example, Cho & Lee (2008) have created discussion board for students from three distant universities and analysed posting frequency in relation to socio-cultural factors.

4.2.2. High social interactivity

Social interactions through different online social networks, or rather high social interactivity, prove to be the richest field of investigation in communication journals. Two main methods of research are employed, depending on the authors' orientation towards either control (experiment) or naturalism (ethnography). Experimental design is usually followed by surveys, and ethnography by in-depth interviews. Field experiment emerges as a method designed to include elements of both.

Ethnographic tradition has flourished in the past twenty years, partly due to the emergence of numerous online communities. In the articles analysed, virtual ethnography methods range from observing online communities to exploring their connections with everyday life. By engaging in online mothering group, Ley (2007) studied the significance of the site architecture for members' commitment to their online support groups, while Campbell (2006) researched interaction among skinheads in a news group. Takahashi (2010), on the other hand, observed his informants' everyday lives in front of the screen settings as well as their on-screen everyday lives through social networking sites.

Behaviour observation is often situated in experimental, not in a natural environment. Nagel & al. (2007) created the virtual online student Jane in order to improve students' online learning success. Potential of networked technologies to facilitate different aspects of young people's civic development was explored using Zora, a virtual city, in the context of a multicultural summer camp for youth. Eastin & Griffiths (2006) used six virtual game settings to study how game interface, game content and game context influence levels of presence and hostile expectation bias. In experimental research the creation of a virtual self, an avatar is exploited as one of the behavioural indicators. This is a part of the wider research interest in multi-user virtual environments (MUVE). Yee & al. (2009) found that people infer their expected behaviours and attitudes from observing their avatar's appearance, while Bente & al. (2008) integrated a special avatar interface into a shared collaborative workspace to assess their influence on social presence, interpersonal trust, perceived communication quality, non-verbal behaviour and visual attention. Schroeder & Baileson (2008: 327) summarized the MUVEs advantages for research: subjects and researchers do not need to be co-located; virtual environments allow interactions that, for practical or ethical reasons, are not possible in the real world; all verbal and nonverbal aspects of the interaction can be captured accurately and in real time; and the social contexts and functional parameters of interactions can be manipulated in different ways. In communication journals MUVE research is used to advance our knowledge of mediated social behaviour and its transfer to offline situations.

Recording participant behaviour is a rather exploited advantage. Although large volumes of data can be easily collected in an objective and automated way, they offer 'thin' descriptors because data recording devices on the Internet track only some aspects of the users' behaviour. In order to get a richer picture of the phenomena under study, authors are using a combination of nonreactive data collection procedures (like log file data) with auto perception data. There are many

authors who use these complementary data gathering techniques and triangulate them to achieve higher validity of results. For example, Ratan & al. (2010) linked survey data with unobtrusively collected game-based behavioural data from the Sony Online Entertainment large back-end databases.

4.3. Technical interactivity

Technical interactivity in the five analysed journals can be labelled as the 'black hole' in communication studies. Neither low interactivity, defined as zero control over technical characteristics of medium or medium structure, nor high technical interactivity, which includes modifications of the medium beyond the pre-given media options, receive any attention at all.

4.3.1. Medium technical interactivity

Medium technical interactivity which includes user control of the medium or system within pre-given possibilities is rarely researched on its own. Rather, it can be said that researchers have embraced various customization and personalization opportunities not as an object of research but as a tool to analyse other aspects of communicative behaviour. Scholars used technical interactivity either as independent variable in experimental design in researching social interaction or as one of the elements affecting textual interaction.

Usage of avatar customization is frequent in Proteus Effect research on the dependence of individuals' behaviour on their digital self-representation (Yee & Bailenson, 2007), as well as in research around the concepts such as social presence or interpersonal trust (Bente & al., 2008). Yee & al. (2009), for example, placed their respondents in an immersive virtual environment and assigned them taller and shorter avatars and looked for variations in behaviour and attitudes depending on the avatar height variation. More towards textual interactivity, Farrar, Krcmar and Nowak (2006) analysed how two internal video games manipulations – the presence of blood which could be switched on or off, and the point of view which could be third or first person - influence perception and interpretation of the game.

In the research on medium technical interactivity, the focus is placed on interactive features of online newspapers and their effects on perceived satisfaction with the newspaper websites (Chung, 2008). Using web based survey to gather respondents' opinions Chung and Nah (2009: 860) specifically examined increased choice options, personalization, customization and interpersonal communication opportunities offered as part of news presentation.

In similar fashion but using experimental design, combined with pre and post surveys. Kalyanaraman and Sundar (2006) created three different version of MyYahoo website to reflect three the conditions being high, low, medium levels of customization.

Among already rare studies of technical interactivity, a study of Papacharissi (2009) holds a special place as the author analyses the underlying structure of three social networking sites «with the understanding that they are all specified

by programming code» (Papacharissi, 2009: 205). By employing comparative discourse analysis and analysis of content, aesthetics and structure of SNSs, Papacharissi examines how individuals modify, personalize and customize these spaces and the extent to which online architecture allows them to do so.

5. Discussion and conclusion

The primary classification of the selected articles, between the types and levels of interactivity, shows that the scholarly focus lies upon the low textual, followed by the high social interactive practices. This could be attributed to the fact that both areas are well situated objects of communication (sociology, psychology mass media) research, and as such they have relatively stable research agendas, concepts and methods. The high textual interactivity and the high technical interactivity are rarely researched, although in their novelty they are probably most challenging.

Investigations into the audience/user relations with texts are still orientated towards content, within the realm of media effects tradition. On the other hand, it is evident that the researchers are increasingly turning to communication practices of social network sites.

Each level of textual interactivity is related to a specific set of media practices and certain regularity in methods used can be noticed. For research of low textual interactivity survey and experiment prevail. The medium level exploits computer-mediated data gathering techniques, while higher level of textual interaction remains an under-researched area.

High social interaction seems to be a central preoccupation in communication studies, reviving the application of ethnographic methods. As Hine observes, «(R)ecognition of the richness of social interactions enabled by the Internet has gone hand in hand with the development of ethnographic methodologies for documenting those interactions and exploring their connotations» (Hine, 2008: 257).

The lowest subset of technical interactivity is not being examined, as unchangeable medium structure is 'taken-for-granted' in classic communication scholarship. In sharp opposition to traditional media, the new digital ones afford and invite tampering with the channel, an activity which from the early days of new technologies gave rise to numerous hacker practices. Still, activities such as modding of games or other software remain outside the dominant communication research agenda.

Looking specifically into methods we can identify innovation in data gathering techniques. In the new media environment, communicators leave traces of their behaviour. Therefore the use of log files and tracking procedures are new valuable sources of information for researchers.

In spite of technological developments the traditional methods like survey, content analysis and experiment are still frequent. There are certain transformations of these methods which can be regarded more as a technical progress than as an essential change. This can be seen in software assisted research and content creation in experimental design. With the proliferation of software tools,

the question remains of how future research can achieve comparability and replicability, more and more often demanded by the research community.

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