TRANSPARENCY OF RESEARCH PUBLISHED IN THE LEADING POLISH EDUCATIONAL JOURNALS

Slawomir Pasikowski

Pomeranian University in Slupsk (POLAND)

Abstract

The article focused on a part of methodological review of research, which was published in the main Polish Journal of Education. The query encompass above the 1200 papers published in the eight journals from 2008 to the end of 2012. An used sheet was based on Hutchinson's and Loevell's research (2004). One of the properties that have been observed are: research strategy, research question and hypothesis, type of sampling, size of sample, method of data collection and data analysis. Based on those elements the transparency was assessed. Generally, transparency was not too high. Analysis pointed out also diversity of transparency due to affiliation of authors.

Keywords: transparency, methodology, research of education.

1 INTRODUCTION

The credibility of the observations and conclusions depends on the correctness of the methodological solutions adopted to be relevant in the context of a particular theoretical orientation. Therefore, particular importance in the process of publishing research results takes transparency of their course what gives customers the opportunity to review and verification of results. Without this they are exposed to the dangers of subjectivism, arbitrariness unauthorized generalization and misleading interpretation of data collected during the research process. Transparency is understood as clarity and is providing reliable evidence [1]. Transparently prepared research report is a full description of those research results. It is open report of the research process and the methods of collecting and analyzing data [1, 2, 3, 4]. Transparency appears to be a key feature for researchers regardless of their methodological orientation, but also for consumers of research [5]. It provides to the readers of the report an insight into the research process and used procedures. As a result, it allows them to assets the credibility of research conclusions. By following the principle of transparency the author himself has the opportunity to make, even during the creation of the process, the critical judgment of their claims and possible corrections.

This transparency requirement stems from the adoption of the principles of intersubjective communicability and intersubjective verifiability. The principles get fulfilment by the publication of the obtained results and exposing the results on the criticism of scientific society [1]. Incidentally, the position of rationalism characteristic of a scientific in empirical research approach [6, 7, 8]has been reflected. Specialized scientific journals seem to be the most suitable area for attempts to criticize the received results' research. Those journals focused a circle of people interested in a those scientific field. Thus, the contents of these journals seem to be the best reflection of the trends in a discipline.

Monitoring of the discipline's leading scientific journals enables to track the broader methodological culture, methodological preferences, prevailing fashions and level of research advancement [9, 10]. Moreover, allow to estimate the possibility and quality of any application of research results for further research or educational practice. Because it allows to define the requirements toward the readers in the scope of necessary knowledge about methods and techniques of data collection and analysis, and the legitimacy of adjudication applications and their generalization. Professional journals also play an important role in the process of continuing and promoting education within the profession of scientific culture. For new researchers they are the source of information on current interests of environment, methods and way of research and presentation of research results. Usability of published results, however, depends on the ability of readers to understand the solutions applied within the methodology and language, as they are described [11, 12, 13]. However, in the latter case, the essential things are the accuracy and intelligibility of description. Therefore, the analysis of the journals contents, including particular empirical articles (research reports), gaining importance in the context of planning and modify training programs for the younger generation of education researchers.

Analysing of scientific journals in the scope of trends and standards in educational theories and research is acknowledged activity monitoring of scientific discipline condition [10, 12, 14, 15, 16, 17].

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In the field of social science among others the psychological [18, 19], management and business journals are encompassed by monitoring [20, 21, 22].

This kind of analysis is not popular in polish investigation of methodological advancement of educational research. Only the two researchers have undertaken the problem during the last few years [23, 24].

The aim of the presented research is investigation of transparency in research reports published in leading educational journals. Review of the attribute have been done by using division on strategy of research, what exactly mean strategy of data collection and analysis [25, 26]. It should make the possible similarities and differences more visible.

Especially, it comes to the communication of course investigation and research results.

At the beginning the two main questions were raised: Whether the transparency of the reports differs in terms of strategy of research? What other aspects are connected with level of transparency?

In the frame of research process a lot of elements are distinguished which is important for verification and replication research results. Among them which were investigate during the research were: problems and hypothesis, methods of gathered data, reliability and validity of tools and research, sampling, strategy of gathering and analysis of data, schemas of research, conclusions and summary and extrapolation of research results. The most popular definitions of the terms were used during the operationalization of variables. Here going to be exposed a part of the research and its results.

2 METHOD

2.1 Sample

The investigation encompassed articles published since 2008 to 2012 in 8 polish educational scientific journals: Education Quarterly, Yearbook of Education, Movement of Education, Present-Man-Education, Science and Higher Education, Educational Studies, Culture and Education, Chowanna. All of them were drawn randomly from a list of twelve the highest scored journals titles on the ministry list.

The period was modelled on another author [10, 17]. The upper limit of the period was effected by changes of scoring scientific journals in Poland from 2012. Because 3 number of Yearbook of Education had not been published till finish gathering the data it were excluded from the analysis. Theoretical discussions and reviews likewise reviews of research also were omitted.

Overall number of investigated articles was 1247. 356 from this were recognised as a research report and these have been analysed. 17 were in English and 3 were in German. Because author does not know German the last articles were excluded from a detailed analysis.

2.2 Tool

The data were gathered by using of special sheet. It was constructed based on Hutchinson's and Lovell's questionnaire [13]. The collection included information about the type of article (theoretical, empirical), the strategy used to gather and analyze data, schema of research, data collection methods, type of statistical analysis likewise the presentation summaries and conclusions. Beyond elements recorded by Hutchinson's and Lovell's in the polish sheet were items related to appearance of reporting: research problems and hypothesis, type of research design, sample size, type of sampling, results and generalizing of conclusions. The title of the journal and author's affiliation were also recorded. All information were collected in the form of text or scores. Assigned 1 point, when the item appeared or 0 points if it was not. 0.5 points were reserved for the unclear situations.

2.3 Procedure

In the presenting research the quantitative strategy collection and analysis of date was used. In the first step assessed whether the articles are a research report. As a research report were acknowledged the articles which contained description of followed procedure and analysis focused around an empirical topic or problem. During the investigation only this kind of publications were taken into account, including those where the research report was an essential part of the article. Publications where research results were evoked to support some thesis as well as articles presenting an overview of some research results were omitted.

In the next steps the data allowing identification of the article, including author affiliation, were recorded. Then the characteristics specified in the data sheet by assigning relevant numbers of points.

To minimize the subjectivity during collection and analysis of data some characteristics were abandoned. This was with main topics undertaken by the authors, ways of defining variables, the nature of explanation and type inference. Although these are interesting threads that Hutchinson and Lovell and Rojewski, Asunda, Kim tried to analyze [13, 16], but it require special preparation procedures for data collection.

During the analysis the points in two subsets of data were summed, thereby the ability to measure more general category, such as transparency and advancement of statistical analysis. In the case of the former, understood as clarity and providing reliable evidence [6], the points for occurrence of descriptions of the 8 elements were added: problems and hypotheses, procedures, methods of data collection, the type of sample selection, the sample size, reliability and validity of tests or tools, presentation of results and discussion. In turn, the coefficient of statistical analysis advancement were obtained by the aggregation of points multiplied by the weight.

The weight for the analysis from descriptive statistics level was 1. When it comes to statistical inference the weight for basic analysis was 2. For the intermediate analysis was 3, and the analysis on the advanced level had weight 4. In the frame of basic statistics were tests of intergroup differences (for dependent and independent groups) and coefficients of correlation in parametric and non-parametric versions (e.g. one-way ANOVA, Friedman ANOVA, Kruskal-Wallis test, t-test, U Mann-Whitney U, Wilcoxon test, r Pearson, r Spearman). Within the intermediate level statistics were multifactorial ANOVA, multiple regression, one-way and multifactorial analysis of covariance (ANCOVA), analysis of pathways, factor analysis, cluster analysis. In the group of advanced statistics: discriminant analysis, correspondence, canonical, logistic, log-linear, non-linear regression models, MANOVA and MANCOVA, structural modelling, neural networks, structural trees.

The characteristics of research reports were analysed from different perspectives and different variables. Here going to be shown only the part of the research project, especially the aspects connected with problem of transparency, strategy of research and authors affiliation.

All hypotheses were tested at a given level of significance $\alpha = 0.05$. It should be emphasized that the presented research is exploratory.

3 RESULTS

Of the 1247 watchlists articles 356 turned out to be research reports, which is slightly more than 28%. 3 of them were in German and therefore were omitted. Combined statement without taking into account the distribution due to the strategies of research showed that more than 71% (n = 251) reports identified research problem or hypothesis, method of data collection in 42% (n = 148), the credibility of the research and research tools in only 9% (n = 32), the procedure of conducting research in more than 29% (n = 104), the type of sampling in 28% (n = 98), but the sample size in 84% (n = 297). Almost all the articles presents the results (n = 343) and their discussion (n = 334).

Rating a strategy of data collection and analysis showed that 249 reports met the criteria for a quantitative strategy, 73 qualitative and 29 mixed. This is relevant to 70.53%, 21.68% and 8.21% of the total number of analyzed reports.

In the next stage of analyzes the hypothesis about difference in transparency between reports realized within different strategies was tested.

After summing up the results for the 8 elements taken into account in assessing the transparency of the report the effect which was obtained shows basically the lack of difference between the three groups reports (Kruskal-Wallis H (2, 351) = 6.23, p = 0.0444 , E^2_R = 0.018; quantitative reports: m = 4.73, sd = 1.43, median = 5, mean rank = 184.48; quality reports: m = 4.29, sd = 1.52, median = 4, mean rank = 156.67; reports mixed: m = 4.24, sd = 1.47, median = 4, mean rank = 151.88). The Kruskal-Wallis test was used because of the large difference in the numbers of the compared groups, and the lack of normality of distributions. Although p-values less than $\alpha = 0.05$, effect size (E^2_R) suggests no relationship between research strategy and transparency. It should be also noted that elimination from analysis the ingredients as "results" and "discussion" causes a reduction of mean to less level than half of the measurement scale. So at 6 possible points the arithmetic mean took the value from an interval from 2.34 to 2.79 with a standard deviation in the range of 1.50 and a median

equal to 2 to 3. Despite of the failure to take account of these two elements still no differences between the types of research reports (Kruskal-Wallis H (2, 351) = 6.00, p = 0.0497; E^2_R = 0.017).

Using statistics can care for foster transparency of reporting. Caring for reporting is entered as a standard of conducting and communication of the statistical analyzes results. Hence the quantitative reports can be more formalized according to common criteria than another reports, and the authors of these quantitative reports can attach more importance to this reporting. Such proceedings are acknowledged as a requirement of confidence and basic element of faithful replication of research. Therefore, the next question was whether the level of applied statistics is associated with the level of transparency. The analysis confirmed this relationship (r Spearman (352) = 0.33, t = 6.54, p = 0.0000): the higher the level of statistics used, the higher the level of transparency. It is not strong, but still significant. When the qualitative and the mixed reports were excluded from analyzes the correlation coefficient was increased (r Spearman (248) = 0.43, t = 7.50, p = 0.0000). In turn, the analysis of compounds with the exception of quantitative reports showed no interdependence of statistics and transparency (r Spearman (104) = 0.01, t = 0.15, p = 0.8778). This result could prove the thesis of the connection between transparency of quantitative research with the advancement of applied statistics during the data analysis. An approximate information on occurring methods is presented in Table 1.

Table 1. Statistical methods and the division in terms of research strategy.

Type of method	Total		Research strategy			
			quantitative		mixed	
	n	%*	n	%*	n	%*
sum, percentage	236	68.85	204	57.79	32	9.10
other descriptive statistics (quantiles, variance, standard deviation)	68	19.26	62	17.56	6	1.70
correlations (parametric, nonparametric)	65	18.41	60	17.00	5	1.41
tests for intergroup differences (parametric, nonparametric)	68	19.26	64	18.13	4	1.13
analysis of regression (simple, multiple)	24	6.80	24	6.80	0	0
mediation and moderation analysis	2	0.57	2	0.57	0	0
multi-factor ANOVA	7	1.98	7	1.98	0	0
MANOVA	1	0.28	1	0.28	0	0
factor analysis	10	2.83	10	2.83	0	0
cluster analysis	7	1.98	7	1.98	0	0
discriminant analysis	2	0.57	2	0.57	0	0
structural equation modeling	3	0.85	3	0.85	0	0
log-regression	3	0.85	3	0.85	0	0
probit regression	1	0.45	1	0.63	0	0

* percent of total reports number, n - number

In the case of mixed strategy the lack of classification methods can be astonishing (for example as log-regression, neural networks, classification trees). The methods are acknowledged as useful solution in elaboration of qualitative data and construction of typology.

By the way, speaking about the methods of quantitative data analysis should be mentioned that analysis of the qualitative methods was difficult because of the minimal information in reports "qualitative" about the solutions. In the case of qualitative data analysis usually there are no specific symbols and signs. Moreover, transition from presentation fragments of empirical material to description, analysis and conclusions is smooth.

In the final step, it was decided to look at the relationship between transparency and institutional affiliation of the authors. It can be assumed that on the basis of affiliation it is possible to determine not only the preferences of research strategies [27], but also clarity of research report. The last can be treated as indicators of methodological advancement.

In order to facilitate presentation in the table were included only academic institutions the most frequently represented in the publications. All of the institutions are academic.

Tab. 2 shows the number of publications represented by concrete institutions the most frequently. In the statement were omitted these publications which had a few authors and the authors represented different institution. Number 10 were arbitrarily took to overview as a number of paper. However, to increase the reliability of the analysis the not a numerical research reports from WSE and NCU were omitted.

Table 2. Frequency of research reports depending on affiliation of academic institution.

Institution	n	%	n omitted in analysis
Warsaw School of Economics (WSE)	10	2.81	0
Nicolaus Copernicus University (NCU)	12	3.37	1
University of Gdansk (UG)	17	4.78	1
The Maria Grzegorzewska Academy of Special Education (ASE)	19	5.34	0
University of Warsaw (UW)	26	7.30	5
Adam Mickiewicz University (AMU)	47	13.20	6
University of Silesia (US)	53	14.89	2
total	184	51.69	15

n - number

To testing the hypothesis of no difference in the intensity of transparency between the groups of research the Kruskal-Wallis test was used. The reason lay in large difference in the numbers of the compared groups, and the lack of normality of distributions. The results (Tab.3) indicate a predominance of reports affiliated by the University of Silesia (US) and the Adam Mickiewicz University (AMU). At the same time it was also found that transparency is differentiated by affiliation. Effect size (E^2_R) strengthens the result obtained. In this respect, dominate the reports affiliated by Academy of Special Education (ASE). It is worth noting that only in the case of reports of ASE and University of Warsaw (UW) the median of assessment of transparency exceeded the half range of the possible points.

Table 3. Differences in transparency of research reports depending on affiliation of academic institution.

Institution	n	m	sd	me	mean rank	Kruskal-Wallis H (4,162)	Effect size (E^2_R)	p value	post hoc
UG	17	4,23	1.30	4	73.00	28.97	0.11	0.0000	ASE > UG, AMU, US UW > US
ASE	19	5,97	1.30	6	125.08				
UW	26	5,00	1.20	5	100.29				
AMU	47	4,27	1.45	4	73.80				
US	53	4,01	1.25	4	66.22				

n- number, m - arithmetic mean, sd- standard deviation, me - median;

UG - University of Gdansk, ASE - The Maria Grzegorzewska Academy of Special Education, UW - University of Warsaw, AMU - Adam Mickiewicz University, US - University of Silesia

4 CONCLUSIONS

The presentation was devoted to illustration of transparency in empirical reports published in 2008-2012 in the leading Polish journals devoted to education. The main aim was to determine the characteristics that could differentiate of this transparency. The presented results show that the information published in these journals were not always transparent, and in particular the information on the reliability of research, procedure, sampling methods, and a description of the method of data collection were ignored. In the course of the analysis also found that reports of quantitative research, qualitative and mixed did not differ in terms of transparency, which was rather small. Reading them, we can refer the impression that they had been prepared with a view to primarily present the results and their discussion. In fact, these elements are present in almost all reports regardless of the research strategy. Hence it is possible that, in the case of the authors or the editorial boards of these journals this is a matter of generalized preferences toward way of research reporting. By the way, it is worth noting that the research reports accounted for approximately 30% of the articles appearing in the scope affected by the query Polish magazines. For example, in the studies referenced by Tsai [10, 17] the frequency of empirical articles was more than 80%.

In the context of the problem of statistical analysis interesting is the result showing increase in transparency with the increasing level of statistical solutions advancement in the group of "quantitative" reports. This compound may suggest a greater methodological awareness the authors who use a more complex analysis.

A separate comment is required toward the relationship between transparency and author's affiliation. Perhaps in this way manifests the methodological sophistication degree of researchers from University of Warsaw and Academy of Special Education. This, however, would require in-depth research.

Also the overrepresentativenes in the range of report quantity from a few institutions need a closer observation. The explanation of this result would require the preparation of a separate project, because, for example, definitely wrong could prove to formulate assumptions about general higher activity of publishing some representatives of certain institution. It is rather a publishing considerations can explain a majority of affiliated articles by these institutions that also produce their magazine. Education Quarterly is published by University of Warsaw, Educational Studies by Adam Mickiewicz University, and Chowanna by University of Silesia.

The displayed relationship can inspire attempts to build maps of the geographical distribution of methodological preferences among researchers of education. This could be interesting and useful project for a search of scientific support, determining the conditions of success and failure in relation to their research projects, as well as diagnose of research prospects determinants, methods and specific research directions.

It is important to remember these all displayed results relate to the reporting of research, and not their actual conducting. Not excluded is that the authors published articles omitted information about

procedure or conditions in which the research proceeded. However, in accordance with the basic principles of intersubjective communicability and verifiability, it is expected that publications will be concluded by the relatively comprehensive information what could let to assess the credibility of the research results and to make possible the replication studies to verify these results.

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