EDUCATION FOR HEALTH SOCIETY: INDICATORS OF BURSTINESS IN RESEARCH

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Abstract

Background: Education for health society attracts more and more research efforts as it facilitates the quality of society’s life. However, research on education for health society is of bursty nature. The phenomenon of burstiness is of particular research interest as it influences the flow of a number of processes including research and the quality of society’s life in general. Research question: What are indicators of burstiness in research? Approach: Interdisciplinary research was applied to the study of the meaning of the key concepts of burstiness, criteria, indicators and research. Moreover, the analysis demonstrates how the key concepts are related to the idea of education for health society and shows how the steps of the process are related following a logical chain: theoretical framework → empirical study → conclusions. Experiment: Qualitative study was applied for empirical analysis. The empirical study was carried out in February 2016. Conclusion: The theoretical findings on the inter-relationship between burstiness and gap processes allow determining the indicators of burstiness of research. The empirical findings of the research allow drawing the conclusions on a high level of research burstiness. A newly formulated research question is presented. Further research directions are proposed.

KEY WORDS: Research, burstiness, criteria, indicators, interdisciplinary research.

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Introduction with aim of the research

Education for health society attracts more and more research efforts as it facilitates the quality of society’s life. However, research on education for health society is of bursty nature. The phenomenon of burstiness is of particular research interest as it influences the flow of a number of processes including research process in particular and the quality of society’s life in general. By phenomenon’s burstiness, intervals of its high-activity alternating with long low-activity periods within a fat-tailed inter-event time distribution is meant (Karsai, Kaski, Barabási, & Kertész, 2012). The phenomenon of burstiness is revealed in a range of scientific fields as demonstrated in Table 1.

<table>
<thead>
<tr>
<th>Scientific field</th>
<th>Phenomenon of burstiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecommunications</td>
<td>Burstiness of bit-errors in data transmission</td>
</tr>
<tr>
<td>Economics</td>
<td>Burstiness of crises</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>Burstiness of disasters, earthquakes, etc</td>
</tr>
<tr>
<td>Logistics</td>
<td>Burstiness of traffic</td>
</tr>
<tr>
<td>Social media</td>
<td>Burstiness of hot topic, keyword, event, etc</td>
</tr>
<tr>
<td>Business</td>
<td>Burstiness of workload</td>
</tr>
<tr>
<td>E-Business</td>
<td>Burstiness of buyers</td>
</tr>
<tr>
<td>Research</td>
<td>Burstiness of researchers (Ahrens, Zaščerinska, 2016)</td>
</tr>
</tbody>
</table>

Beginning in 1960 Gilbert (1960) presented the first model in telecommunications which emphasized that bit errors occurred in bundles (Wilhelm, 2014b) or, in other words, bursts. Since then, the issues of a general procedure to evaluate the performance or, in other words, research process in the present contribution, as well as a basic set of parameters (Elliott, 1963) or, in other words, indicators, are still relevant today (Wilhelm, 2014a).

In research, burstiness of the research process has been recently identified (Ahrens, Zaščerinska, 2016). The previous work in the field of burstiness of the research process focused on investigations of (Ahrens, Zaščerinska, 2016)
- the theoretical inter-relationship between research and its burstiness that allow determining that
  the flow of the research process is of bursty nature,
- the empirical analysis of research that allow drawing the conclusions on the researchers’
  burstiness in the research process.

Research question: What are indicators of burstiness in research on education for health society?

The aim of the research is to analyze scientific literature on process burstiness underpinning
elaboration of indicators of burstiness in research.

**Methods and methodologies**

The meaning of the key concepts of burstiness, criteria, indicators and research is studied. Moreover,
the analysis demonstrates how the key concepts are related to the idea of education for health society
and shows a potential model for development, indicating how the steps of the process are related following a
logical chain: conceptual framework → empirical study → conclusions.

The present contribution employs interdisciplinary research as interdisciplinary research assists in
synthesizing, connecting and blending ideas, data and information, methods, tools, concepts, and/or
theories from two or more disciplines in order “to make whole” (Repko, 2012).

The process of interdisciplinary research is organized as revealed in Figure 1 (Ahrens, Bassus,
Zaščerinska, 2014):

- In Phase 1 of the interdisciplinary research, an issue is separately explored by two or more scientific
disciplines.
- In Phase 2, the same issue is examined by the synergetic point of view of these two or more
scientific disciplines.
- In Phase 3, results of the analysis are interpreted.

For the search of indicators of burstiness in research, the synergy between research and
 telecommunications is promoted as the phenomenon of researchers in research process as well as bit-
errors in data transmission appear to be of a similar nature, namely, the bursty nature. Such
methodologies that consider the bursty nature of bit-errors in data transmission have been successfully
implemented in telecommunications for optimizing data communication protocols and will be adopted in
this work to the research burstiness. It should be noted that the present research is not limited to only two
scientific disciplines, namely, education and telecommunication, but is based on a number of scientific
disciplines such as business including e-business, social media, logistics, literature, etc.

The remaining part of this paper is organized as follows: the following section introduces burstiness
in research and the search for indicators for evaluation of burstiness in research. The following section
also presents the associated results of an empirical study. Finally, some concluding remarks are provided
followed by a short outlook on interesting topics for further work.

**Results of the research**

**Theoretical Framework**

Research is an integral part of a single learning process (Zaščerinska, 2009, p. 24) as indicated in
Figure 2.
Consequently, the terms research and learning are used synonymously in the present contribution. Learning is defined as a purposefully organized or spontaneous individual process of individual improvement of his/her individual experience (knowledge, skills and attitudes) based on cognition (Ahrens, Zaščerinska & Andreeva, 2013, p. 35) of social nature.

In the present work, research is built within the paradigm of researchers’ binary behaviour. For identifying researchers’ binary behaviour, such an everyday research situation is considered as potential researchers have to solve an issue formulated already in 1603 by William Shakespeare in his play *Hamlet* such as "To be, or not to be" (Shakespeare, 1825). Regarding a modern interpretation of potential researchers’ contemporary problems, Shakespeare’s words may sound as “to investigate, or not to investigate”. It should be noted that “to investigate, or not to investigate” is considered as researchers’ binary behavior depicted in Figure 3.

Researcher report on a carried out scientific investigation serves as an output of the research process. Figure 4 shows a typical scenario in which a researcher who presents a report on a carried out scientific investigation as the output of the research process is highlighted (represented by “x”) within a sequence of people (represented by “-”) who do the research without reporting. By people any researcher who does the research without reporting is understood in the present contribution.

Research or, in other words, research process, which ends without a report on a carried out scientific investigation means a gap (Ahrens, Purvinis, Zaščerinska, Andreeva, 2015) in the present work. It should be noted that the terms “gap”, “gap process” and “gap distribution function” are used synonymously in the present contribution. Gaps are rooted in the Hidden Markov Models (HMM). What has however interested communication protocol developers and coding theorists, are the probabilities of error structures in any finite time interval such as the block length or the cycle length of a transmission.
procedure (Wilhelm, 2014b). These probabilities are typically difficult to present analytically (Wilhelm, 2014b). Many studies have found that the block error probability (pb) dependent on the block length (n) in the initial part is linear when presented double-logarithmically (Wilhelm, 2014b). With this approach, Wilhelm (2014b) developed the gap L-model (Gap Model) and distance A-model with complete sets of formulae concerning the probabilities of error structures occurring in bursts, and in blocks. The gaps between two researchers are assumed to be statistically independent from each other (Ahrens, Purvinis, Zaščerinska, Andreeva, 2015). Figure 5 illustrates the research process between two researchers described by gap processes.

![Figure 5. Researcher's gap for describing researchers' binary behavior](image)

However, the researchers can be more independently distributed over e.g. a day or they can appear really concentrated as highlighted in Figure 6.

![Figure 6. Researchers' burstiness (represented by “x”) within a sequence of people who do the research without reporting (represented by “-“)](image)

In situations where binary decisions are made in research process, not only a report on a carried out scientific investigation as the output of the research process is of any research interest but also how concentrated reports are presented. That is why models which focus only on reports on a carried out scientific investigation with a given probability are not exact enough to describe research process. In general, the researchers’ probability can serve as a clear indicator of how often people decide to do research. However, the researchers’ probability does not deliver any information about how concentrated the research is.

In order to determine a criterion of the research process, the term criteria are defined. Criteria serve to structure, assess and evaluate (Špona, Čehlova, 2004). Criteria are identified by analysis of (Špona, Čehlova, 2004) - definition of the research object, - structure of the research object and - factors (Špona, Čehlova, 2004).

For outlining a criterion, analysis of the bursty nature of researchers in research process is taken into consideration. As burstiness shapes the structure of the research process, burstiness is a criterion in research process.

In its turn, criterion is described by indicators. The term indicator is identified as the component to determine developmental dynamics of the object (Zaščerinska, 2013). It should be noted that in the present contribution, the terms indicators and parameters are used synonymously. By a parameter, definable, measurable, and constant or variable characteristic, dimension, property, or value, selected from a set of data (or population) to understanding a situation (or in solving a problem) is understood (Business Dictionary, 2015). In the present contribution, indicators of burstiness in research are determined via mathematical analysis such as following:
Analyzing the researchers’ characteristic, we can define a block interval \( n \) (identified as the probability \( p_B(n) \)) where at least one researcher appears. The parameter \( n \) refers e.g. to the total number of people doing research in a given time e.g. a day. Choosing the parameter \( n = 1 \) the probability \( p_B(n) \) equals the researchers’ probability \( p_e \).

Now we can assume that the probability \( p_B(n) \) can be described as a function of the researchers’ probability \( p_e \) and the block interval length \( n \). Here the following approximation is used (Wilhelm, 1976; Ahrens, 2000)

\[
p_B(n) = \begin{cases} 
  p_e \cdot n^a & 1 \leq n \leq n_0 \\
  1 & n > n_0.
\end{cases} \tag{1}
\]

Table 2 illustrates the levels of the probability \( p_e \).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Indicator</th>
<th>Levels</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burstiness</td>
<td>Probability ( p_e )</td>
<td>very low</td>
<td>0.00</td>
<td>0.11</td>
<td>0.41</td>
<td>0.60</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>low</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>average</td>
<td>0.10</td>
<td>0.39</td>
<td>0.59</td>
<td>0.79</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>high</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>very high</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

The value \( \alpha \) denotes the linear dependence between and and is a measure for the researchers’ concentration (also referred to the concentration of research process). The value of \( n_0 \) indicates the maximum block length to which the linear-dependence can be maintained (see Figure 7).

![Figure 7. Relationship between the probability \( p_B(n) \) and the block interval \( n \) for different parameters of the \((1 - a)\) at a researcher’s probability of \( p_e = 10^{-2} \)]](image)

The analysis of concentration parameter \((1 - a)\) (referred to the concentration in research process) has shown that parameters in the range of 0.0 until 0.5 describe realistic scenarios. Thereby, a parameter \((1 - a) = 0\) describes the situation where the potential researchers appear independently distributed from each other. Table 3 outlines the levels of the concentration \((1 - a)\).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Indicator</th>
<th>Levels</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burstiness</td>
<td>Concentration ((1 - a))</td>
<td>very low</td>
<td>0.00</td>
<td>0.11</td>
<td>0.41</td>
<td>0.60</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>low</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>average</td>
<td>0.10</td>
<td>0.39</td>
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<tr>
<td></td>
<td></td>
<td>high</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>very high</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
With increasing parameter \((1 - a)\) the researchers appear more and more concentrated and the probability \(p_B(n)\) decreased for a given \(n\). With the assumption that the distances (gaps \(k\)) between neighboring researchers are statistically independent from each other, the researchers’ characteristic, namely the occurrence of bursty researchers, is defined by the researchers’ gap-distribution function \(u(k) = P(X \geq k)\), which describes the probability of a gap larger than \(k\). The setup

\[
p_B(n) = \begin{cases} 
p_C^{n-1} \sum_{k=0}^{n-1} u(k) & 1 \leq n \leq n_0 \\
1 & n > n_0 \end{cases}
\]  

(2)

is used to develop the researcher’s gap distribution function \(u(k)\) for the researchers’ gaps step by step. Comparing (1) and (2), one gets:

\[
\sum_{k=0}^{n-1} u(k) = n^a \quad 1 \leq n \leq n_0
\]

(3)

and for the searched error-gap distribution \(u(k)\) we yield:

\[
\begin{align*}
n = 1 &: u(0) = n^a \\
n = 2 &: u(0) + u(1) = n^a \\
n = 3 &: u(0) + u(1) + u(2) = n^a \\
\vdots & \vdots \\
n \leq n_0 &: u(0) + u(1) + \ldots + u(n-1) = n^a
\end{align*}
\]

\[
\text{The researchers-gap distribution function } u(k) \text{ can be defined as follows:}
\]

\[
u(k) = \begin{cases} 
(k+1)^a - k^a & 0 \leq k \leq n_0 \\
0 & k \geq n_0 \end{cases}
\]

(4)

Re-writing of \(u(k)\) leads to the researchers-gap density function \(v(k) = P(X = k)\), which describes the probability of a gap \(X\) equal to \(k\):

\[
\begin{align*}
u(k) &= v(k) + v(k+1) + v(k+2) + \ldots \\
u(k+1) &= v(k+1) + v(k+2) + \ldots
\end{align*}
\]

and by calculating the difference between \(u(k)\) and \(u(k+1)\) the researchers-gap density function \(v(k) = P(X = k)\) can be obtained.
\[ v(k) = u(k) - u(k+1). \] (5)

Assuming that the researchers are independently distributed, i.e. \((1 - a) = 0\), and using equation (4) and (5) one gets the following result for the researchers-gap density function \(v(k)\):

\[
v(k) = \begin{cases} 
1 & k = (n_0 - 1) \\
0 & k \neq (n_0 - 1) 
\end{cases} .
\] (6)

With this result, the disadvantage of the model setup becomes evident. The model setup defined in (1) leads to a deterministic researchers-gap process. In situations, where the researchers appear concentrated, i.e. \((1 - a) > 0\), one can also find an enlarged value at \(v(n_0 - 1)\). This error leads to engraving inaccuracies in the simulation process. The reason is the discontinuity at \(n = n_0\) in equation (1). A modification of this model setup is necessary. The following solution can be assumed: The linear increases of \(\beta\) can only be accepted for small parameters of \(a\). The value of \(\beta\) has to change steadily into the value for larger \(n\). To the minimization of the model inaccuracy at \(v(n_0 - 1)\) equation (4) has to be multiplied by the value \(e^{-\beta k}\) [7]. For the researchers-gap distribution function \(u(k)\) the following expression arises:

\[ u(k) = ((k + 1)^a - k^a) e^{-\beta k} \quad 0 \leq k \leq \infty \]

with

\[ \lim_{k \to \infty} e^{-\beta k} = 0 \quad \beta > 0 \]

and

\[ \beta \approx \frac{1}{p_e}. \]

Figure 8 illustrates the researchers-gap distribution function \(u(k)\) for different parameters \((1 - a)\) assuming a researcher’s probability of \(p_e = 10^{-2}\).

\[ Figure 8. Researchers\text{-}gap distribution function \(u(k)\) for different parameters of \((1 - a)\) at a researcher’s probability of \(p_e = 10^{-2}\). \]

The resultant researcher-gap density function \(v(k)\) is depicted in Figure 9.
Finally, the proposed system setup is highlighted in Figure 10. Now, the researcher characteristic can be modelled by two parameters (the researcher’s probability $p_e$ and the researcher’s concentration value $(1 - a)$).

With the assumption that the distances between neighboring researchers are statistically independent from each other the model characteristic is described completely by the researcher’s distribution function $u(k)$. For the creation of the gap processes a uniformly distributed random number $Y$ is identical to the function $u(k)$ and the corresponding value of the researcher’s gap is determined. For this, the following equation

$$Y = u(k)$$

has to be solved numerically.

Hence, the criterion of researchers’ burstiness includes such indicators as probability and concentration (Ahrens, Purvinis, Zaščerinska, Andreeva, 2015) as summarized in Table 4.
For comparison purposes, Table 5 demonstrates the model of evaluation of burstiness of hot topic, keyword, event, etc in a sequence of batched georeferenced documents in social media developed by a group of Japanese researchers as geo-annotated user-generated data on social media sites is becoming one of the most influential sources of information (Kotozaki, Tamura, Kitakami, 2015). It should be noted that the term model is of great research interests. In pedagogy, by model a pattern is meant (Beļickis, Blūma, Koče, Markus, Skujiņa, & Šalme, 2000). In mathematics, a model is an interpretation of a theory (Kühne, 2005). In engineering, business and computer sciences, a model describes a system (Banks, Carson, Nelson, Nicol, 2004). Interdisciplinary (pedagogy, mathematics, engineering, business and computer sciences) analysis of the term model leads to such a newly defined notion of the term model as a pattern of individual’s or individuals’ interpretation of a phenomenon (Ahrens, Purvinis, Zaščerinska, Andreeva, 2015). Models can be presented in a variety of forms such as verbal, graphic, computer, etc (Ahrens, Purvinis, Zaščerinska, Andreeva, 2015).

### Table 5

<table>
<thead>
<tr>
<th>Criterion and indicator of burstiness in social media</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Burstiness of hot topic, keyword, etc in a sequence of batched georeferenced documents</th>
<th>Locality</th>
</tr>
</thead>
</table>

This group of Japanese researchers built their model of evaluation of burstiness of hot topic, keyword, etc in a sequence of batched georeferenced documents on Kleinberg’s burst detection algorithm (2002), which is based on a queuing theory for detecting bursty network traffic (Kotozaki, Tamura, Kitakami, 2015). It should be noted that Kleinberg’s solution does not provide clear distinction between within-burst and out-of-burst records (Mai, Ajwani, Sala, 2015).

A comparative analysis of the model of evaluation of burstiness of hot topic, keyword, etc. in social media shown by the group of Japanese researchers (Kotozaki, Tamura, Kitakami, 2015) and the model for evaluation of researchers’ burstiness in research process is reflected in Table 6.

### Table 6

<table>
<thead>
<tr>
<th>Comparison of models for evaluation of burstiness in social media and research</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Model's element</th>
<th>Social media</th>
<th>Research process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria</td>
<td>Burstiness of hot topic, keyword, etc in a sequence of batched georeferenced documents</td>
<td>Researchers’ burstiness</td>
</tr>
<tr>
<td>Indicators</td>
<td>Locality</td>
<td>Researchers’ probability</td>
</tr>
<tr>
<td>Feature</td>
<td>Sequence of batched georeferenced documents</td>
<td>Sequential independence of gaps between two researchers or sequentially independent gaps of length k between the individual researchers</td>
</tr>
<tr>
<td>Methodological background</td>
<td>Kleinberg’s burst detection algorithm (2002), which is based on a queuing theory for detecting bursty network traffic and yields a nested representation of the set of bursts that imposes a hierarchical structure on the overall stream.</td>
<td>Gap distribution function within a sequence of the disturbed and interrupted transmission intervals</td>
</tr>
</tbody>
</table>
The comparative analysis of Table 6 reveals that Kleinberg’s burst detection algorithm, which is based on a queuing theory, is applicable to a sequence of phenomena while gap distribution function is featured by sequential independence of gaps between two researchers. The comparative analysis assists in drawing such a conclusion as research process is characterized by independence of gaps between two researchers. Consequently, the methodological background for evaluation of researchers’ burstiness in research process should take it into account while developing a model for evaluation of researchers’ burstiness in research process.

Empirical Study

The present part of the contribution demonstrates the design of the empirical study, results of the empirical study and findings of the study.

The design of the present empirical study comprises the purpose and question, materials and methodology of the present empirical study.

The empirical study was aimed at evaluating the burstiness in research process. The empirical study’s question was as follows: What is the level of burstiness in research on education for health society?

The present empirical study was carried out in February 2016. Analysis of statistical documents of a section on health education of an international scientific conference in a Baltic state in the period between 2012 and 2016 was implemented.

Interpretive research paradigm was used in the present empirical study. Interpretive research paradigm corresponds to the nature of humanistic pedagogy (Luka, 2008). The interpretive paradigm aims to understand other cultures, from the inside through the use of ethnographic methods such as informal interviewing, participant observation and establishment of ethically sound relationships (Taylor and Medina, 2013). Interpretive paradigm is characterized by the researcher’s practical interest in the research question (Cohen, Manion, Morrison, 2003). Researcher is the interpreter.

Qualitative study was applied for empirical analysis. Exploratory research was used in the empirical study (Mayring, 2007). The exploratory type of the comparative study aims to generate new hypotheses and questions (Phillips, 2006). The exploratory methodology proceeds from exploration in Phase 1 through analysis in Phase 2 to hypothesis development in Phase 3 (Bassus, Ahrens, Zaščerinska, 2015). Phase 1 Exploration is aimed at data collection; Phase 2 Analysis focuses on data processing, analysis and data interpretation; Phase 3 Hypothesis Development ensures analysis of results of the empirical study and elaboration of conclusions, hypotheses and research questions for further research (Bassus, Ahrens, Zaščerinska, 2015).

The qualitatively oriented empirical study allows the construction of only few cases (Mayring, 2004). The cases themselves are not of interest, only the conclusions and transfers we can draw from these documents (Flyvbjerg, 2006). Selecting the cases for the case study comprises use of information-oriented documents, as opposed to random documents (Flyvbjerg, 2006). This is because an average case is often not the richest in information. In addition, it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently they occur (Flyvbjerg, 2006).

Analysis of statistical documents of a section on health education of an international scientific conference in a Baltic state in the period between 2012 and 2016 included the search for the number of submitted and accepted papers. The findings on the number of submitted and accepted papers a section on health education of an international scientific conference in a Baltic state in the period between 2012 and 2016 is presented in Table 7.

<table>
<thead>
<tr>
<th>Year</th>
<th>Submitted papers</th>
<th>Accepted papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>2013</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>2014</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>2015</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>
Further on, Table 8 illustrates accepted papers (represented by “x”) within a number of submitted paper (represented by “-“) in the period between 2012 and 2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Sequence of submitted and accepted papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>-xxx-xxxxxx</td>
</tr>
<tr>
<td>2013</td>
<td>xxxx-xxxxxx</td>
</tr>
<tr>
<td>2014</td>
<td>xxx-xxxxxx-xxx-xx</td>
</tr>
<tr>
<td>2015</td>
<td>xxxxxxx-xxx-x-xxxxxx</td>
</tr>
<tr>
<td>2016</td>
<td>x-xxxxxx-xxxxxxx</td>
</tr>
</tbody>
</table>

Based on the results presented in Table 8, the indicators of burstiness, namely probability and concentration, were calculated. Table 9 summarizes the obtained results of both indicators, namely probability and concentration.

<table>
<thead>
<tr>
<th>Year</th>
<th>Submitted papers</th>
<th>Accepted papers</th>
<th>Probability $p_e$</th>
<th>Concentration $(1 - a)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>11</td>
<td>9</td>
<td>0.81</td>
<td>0.70</td>
</tr>
<tr>
<td>2013</td>
<td>11</td>
<td>10</td>
<td>0.91</td>
<td>0.73</td>
</tr>
<tr>
<td>2014</td>
<td>18</td>
<td>13</td>
<td>0.72</td>
<td>0.61</td>
</tr>
<tr>
<td>2015</td>
<td>23</td>
<td>17</td>
<td>0.74</td>
<td>0.69</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>15</td>
<td>0.75</td>
<td>0.73</td>
</tr>
</tbody>
</table>

Based on the results presented in Table 9, Table 10 indicated levels of burstiness in research process in the period between 2012 and 2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Probability</th>
<th>Probability level</th>
<th>Concentration $(1 - a )$</th>
<th>Concentration level</th>
<th>Level of burstiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>0.81</td>
<td>very high</td>
<td>0.70</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2013</td>
<td>0.91</td>
<td>very high</td>
<td>0.73</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2014</td>
<td>0.72</td>
<td>high</td>
<td>0.61</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2015</td>
<td>0.74</td>
<td>high</td>
<td>0.69</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2016</td>
<td>0.75</td>
<td>high</td>
<td>0.73</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

Summarizing content analysis (Mayring, 2004) of the data reveals the burstiness in research process within a section on health education of an international scientific conference in a Baltic state within the period between 2012 and 2016 is high.

Discussion

The present research has limitations. The inter-connections between burstiness, research on education for health society, criteria, indicators and gap processes have been set. Another limitation is the empirical study based on one case only, namely a section on health education of an international scientific conference in a Baltic state within the period between 2012 and 2016. Therein, the results of the study cannot be representative for the whole area. Nevertheless, the results of the research, namely the elaborated indicators and levels of probability and concentration for evaluation of burstiness based on gap processes, may be used as a basis of analysis of burstiness in other scientific disciplines. If the results of
other cases had been available for analysis, different results could have been attained. There is a possibility to continue the study.

Conclusions

The theoretical findings on the inter-relationship between burstiness and processes allow determining the indicators probability and concentration as well as the levels of burstiness.

The empirical findings in the present contribution allow drawing the conclusions on a high level of burstiness in research process within a section on health education of an international scientific conference in a Baltic state within the period between 2012 and 2016.

The following research question has been formulated: What is the inter-relationship between levels of burstiness and quality of research on education for health society?

Further research tends to facilitate the advancement of the theoretical framework on burstiness in a process. The search for relevant methods, tools and techniques for evaluation of burstiness in a process is proposed. Future research tends to focus on empirical studies to be carried out in other European countries. And a comparative research of different countries could be carried out, too.

References


**BILDUNG FÜR EINE GESUNDE GESELLSCHAFT: MODELLIERUNG GEBÜNDELT AUFTRETENDER FORSCHUNGSAKTIVITÄTEN**

**Zusammenfassung**