

Chapter 5

Wikigrams–Based Social Inquiry

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ABSTRACT

This chapter presents techniques that combine the productive activity aimed at creation of collaborative stories with the research activity based on the analysis of the relationship between the participants of the productive activity. The productive activity is delivered through a wiki site Letopisi.org, where all actions of the participants are recorded in an electronic log. Log records are used as a data source to build sociograms, which constitute the basis for the research activity. The chapter describes different cycles of collaboration based on the usage of social objects. The first cycle is creation of digital story. The second cycle is social inquiry.

INTRODUCTION

Social media attracts attention of researchers and widely used in various spheres. However, in education, dynamics of social networks, extensive data on interrelations between network participants, network analysis techniques are hardly used. It comes from the widespread belief that the network data is hard to access or that the network analysis is too complicated. In this chapter, we will demonstrate that the network provides a great platform for inquiry-based learning. We present a number of simple methods of learning analytics as well as on the methods of creating static graphs (Graphvz) and dynamic models (NetLogo), which many teachers are familiar with. The source material for the research is log records. The set of log-records is a by-product of a specific learning activity, which is a digital storytelling. Cycles of

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interleaving storytelling and research activities of the learners are interconnected by using the proposed approach. The by-product results of the learner's storytelling activities are used as a feed substrate for the network research based on the analysis of sociograms. It provides an advanced pathway to developing pedagogical means that utilize the science of complex networks as a vehicle through which students can acquire analytical skills for the network-oriented data analysis.

BACKGROUND

Science, Technology, Engineering, and Mathematics (STEM) are the driving force for worldwide economic and social advancements. The skills needed by the 21st century STEM workforce include the ability to interact with large amounts of data and the ability to understand the changing role of models. Educational systems worldwide are not keeping up with the explosion in the big data and data-driven sciences. However, exposure to these data-driven science skills is unavailable to most primary and secondary school students. Network science is a promising way to address data-intensive real-world problems (Cramer et al., 2015). Network science is an emerging, highly interdisciplinary research area that aims to develop theoretical and practical approaches and techniques to increase our understanding of natural and man-made networks (Börner, Sanyal, & Vespignani, 2007). We are surrounded by systems that are collectively called complex systems, capturing the fact that it is difficult to derive their collective behavior from knowledge of the system's components. Complex systems understanding, mathematical description, prediction, and eventually control is one of the major scientific challenges of the 21st century. Nature, science and technology are permeated with networks, and we will never understand complex systems unless we develop a deep understanding of the networks behind them (Barabási, 2016). A working definition of network science is the study of network representations of physical, biological, and social phenomena leading to predictive models of these phenomena (Committee on Network Science for Future Army Applications & National Research Council, 2005).

The network perspective allows us to address deep questions about different systems.

By postulating a friendship network in (say) a school classroom of 25 students, we have taken a theoretical step that is non-trivial. We have supposed that separate individuals are not an adequate representation, moreover that even separate dyads are insufficient; rather, that there is a unity within the classroom that makes it

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