Chapter 13
Exploring Semiotic Approaches to Analysing Multidimensional Concept Maps Using Methods that Value Collaboration

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ABSTRACT
This chapter focuses on teachers’ multidimensional concept mapping data collected at the beginning and end of a one-year Masters level course about e-learning. A multidimensional concept map (MDCM) defines any concept map that is multimodal, multimedia, multilayered and/or multi-authored. The teachers’ personal and professional learning priorities are analysed using two semiotic methods: the first is a traditional analysis of the words used to label the nodes; the second is an innovative analysis method that treats the whole map as a semiotic artefact, in which all the elements, including the words, have equal importance. The findings suggest that these tools offer deep insights into the learning priorities of individuals and groups, especially the affective and motivational factors. The teachers, as co-researchers, also adopted MDCM to underpin collaborative thinking. These research tools can be used in the assessment process to value multimodal literacy and collaborative engagement in new knowledge construction.

INTRODUCTION
This chapter reports on the research, development and modification of tools for the semiotic analysis of hand-drawn, desktop-published and digital concept maps called multidimensional concept maps (MDCM) that will be defined in the first section. These MDCM were collected at the beginning and end of a Continuing Professional Development (CPD) programme for teachers. The Masters level module was about e-learning, a term that refers to any learning that is electronically mediated using digital technologies. Examples would include a learning episode when information is derived from digital resources online or where the learning discussion is hosted in a virtual learning environment (VLE).

The objective of the chapter is to provide innovative socio-cultural tools for the analysis of MDCMs that provide insights into learners’ priorities. These insights are expected both to improve understand-
ing of learning processes for the researcher, the
tutor and the map-maker, and to provide emerg-
ing multidimensional tools for assessing learning
priorities. In particular, the benefits are considered
for teachers who are conducting their own research
projects with colleagues and pupils.

The chapter covers the meaning of the key
terms, concept maps, mind maps and multidimi-
densional concept maps as well as offering a
definition of semiotics. The findings from the
maps are described and the potential roles for
researchers and co-researchers in the map-making
process are also explored. The findings consider
the value of the tools in identifying collaborative
learning and future trends.

DEFINING A
MULTIDIMENSIONAL MAP

The terms concept map and mind map are often
used interchangeably. In fact, they refer to different
methods of mapping and different map-shapes.
The term concept map is most often associated
with Novak who has worked in this field with
other colleagues since the 1980s (Novak and
Godwin, 1984; Cañas and Novak, 2007). The
Novakian system requires the careful teaching
of agreed topics followed by the construction of
a prescribed hierarchical map shape by single
learners or groups (Figure 1). Ålhberg (2007)
is critical of the high levels of prescription and
points out some inconsistencies. Nevertheless,
in his own work he only reduces the number of
rules and clarifies them rather than questioning
the prescriptive method.

A different map-shape is promoted by Buzan
(2002), called a mind map, to refer to maps that
radiate from the centre. For Buzan mind maps
mirror how the mind works. In contrast to Novak
he promotes a free mapping exercise where the
map-maker provides the content from professional
or personal thinking exercises. However, Buzan’s
belief that these mind maps reflect the ways in
which the brain works is not supported by the
limited research into the topic (Anderson-Inman
and Ditson 1999). (see Figure 2)

So far, much of the research into mapping has
continued to follow this pattern of prescriptive
teaching leading towards drawing shapes that are
agreed in advance. This study, on the other hand,
concentrates on the map-makers’ creativity in ex-
ploring their own concepts, rather than following
instructions from the teacher. This willingness
to listen to the learner is a key principle in this
alternative approach to mapping associated with
the socio-cultural school of semiotics.

Saussure (1916), a founding theorist in this
area, defined semiotics as the science of the
life of signs in society. Since then semiotics has
developed as an all-encompassing term for the
study of any kind of sign that is used in a culture
to communicate meaning. These signs can be in
many different modes including sound, animation,
graphics, gaze and gesture. Signs are often, there-
fore, described as multimodal and the capacity
to read them is regarded as multimodal literacy
(Jewitt and Kress 2003). Another important aspect
of the sociocultural semioticians approach is their
explanation of the four communicative strata: discours;
design; production, and dissemination
(Kress and Van Leeuwen 2001). These strata em-
phasis the dynamic set of collaborative processes
that result in effective multimodal communication.
These strata are not valued in many traditional
learning and assessment situations.

The hypothesis in this study was that the
teachers might not be as multiliterate as their
students. As a result it was not practical, when the
study began, to request the teachers to use digital
mapping software. The resourcing and training
challenges were too great. Pen and paper was the
default option. However, during the one-year data
collection period the teachers’ multimodal literacy
improved. Some of the map-makers elected to use
desktop publishing. A few used digital mapping
packages and one used a sophisticated mapping
package linked to the internet that allowed authors
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