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THE CARNIVAL OF THE ANIMALS (COA) - IPAD APP AS A TOOL FOR THE STUDENTS' PROFESSIONAL GROWTH VIA PRACTICE ORIENTED RESEARCH ON CULTURE-BASED INTERACTION

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ABSTRACT

The education profession is currently facing the world of touch-based electronic devices in the teaching profession. Richtel (2010) reported concerns of the devices may bring. iPad also might help creative stimulation (Geist, 2012), and help boost the individual learning levels of children (Wilkinson, 2010). In this study project, the Carnival of the Animals (COA) -app for the iPad was set as a tool for the teacher students' professional growth while also investigating the children's interaction behavior. The project was based on child-oriented and practice based study methods. Besides the video and tracking data (669,89 min.) resulting from the COA study procedure (Perez & Cslovjecssek, 2013), including two interviews in each family performed by the students (n=20) with the 3-4-year-old children (n=10), five students were interviewed (195,16 min. data) six months after the study process. Data on one of the children analyzed by a group of students was taken for a more detailed analyses by the teacher-researcher. As a result of the project, according to the students' professional identity and growth, and especially with reference to the two parallel analyses (student – teacher-researcher) made, it was shown that a deeper musical basis, knowledge and understanding of the musical elements, would provide the student with a variety of tools to observe and interpret the child's musical interaction behavior. The COA as a tool may support the development of the professional identity, in a culture-oriented dialogue with music education with its possibilities to support the student also in the research-oriented tasks.

INTRODUCTION

The Carnival of the Animals (COA) -iPad app as a possible tool for the students' professional growth was investigated via practice oriented research on culture-based interaction. The aim was to create understanding of the iPad as a tool in education, as the field is still missing research results. Many factors point out to the need of finding research evidence on the use of these devices with children in education. Richtel (2010) reported concerns of the devices may bring with possible problems and addictions games might cause (Adams, 2014). iPad also might help creative stimulation (Geist, 2012), and help boost the individual learning levels of children (Wilkinson, 2010). In this investigation, the understanding of the connections of well-being/positive equilibrium (Marjanen & Poikolainen, 2012), music and languages as interaction, holistic learning processes and multisensory experiences (cf. Marjanen, 2015) were set as a ground to understand the child's behaviour and the students' professional development. (Evelein, 2015; Marjanen & Cslovjcek, 2014).

However, as the COA App seems to support the child's interaction behavior (Marjanen, 2014a; 2014b; 2015; 2016; Marjanen & Cslovjcek, 2016; Tu, Hao, & Hernandez, 2016; Tu, 2016; Tu, Cslovjcek, Pérez, Blakey, & Shappard, 2014), it also awoke our interest towards the possible support to learn about the child's interaction behavior during the teacher studies. Interaction can be considered as one of the core fields of a teacher, connected with the professional identity. In the current paper, the focus includes the main approaches from musical interaction and research in musical interaction, to support the students' professional identity. The major subject of those students is constructed from the social service's field, with a special focus on early childhood studies, to provide them with a special qualification for a kindergarten/nursery school/early childhood teacher (60 cr)¹.

THE THEORY

The study aims to serve the understanding of the child's interaction as a basis for the teacher's work; thus it is clearly practice-originated. In this paper, the theory includes the idea of music as cultural framework, basic comprehensions of knowledge and skills, especially on the concept of tacit knowledge, and professional identity.

Music as a cultural framework in learning

Music can be understood as a bridge between many phenomena, but one of the most important ones is the understanding of music as a tool to pass on cultural meanings and understanding between generations and nations. It functions also in

the subcultures, representing the voices of families, going towards Hinde's (1997) theory as presented later in this paper, towards the 21st Century skills (Gordon, Halsz, Krawczyk, Leney et al., 2009) and the components of social learning (Wenger, 1998). The musical circle can be described as experiences of "leaving the reality" and through imagination and mental images (Kurkela, 1994). This connects music strongly also to the understanding of tacit knowledge (Polanyi, 1966/1983), as described later.

Musical elements

The elements of music function also as the elements of language. They support the interaction and teaching purposes towards the set goal, functioning as a low-threshold model for music and language learning to meet the teaching practices. The elements of music provide us with the abilities to interact, to talk and create music. Interaction behaviour also supports us in learning (Vygotski, 1978). These elements are rhythm, pitch, loudness, timbre, duration, harmony and form. Besides these elements, it is essential to include emotions in the message, to blow the spirit in music. This is also important for learning in any form, and one of the reasons for music being such a strong factor.

Music, language and interaction

As a ground for musical, linguistic and speech interaction, it is important to remember, that even though information is created and transmitted through words and in social networks, we still rely on the individual interpretations on the basis of our own background. Thus, all information includes the tacit dimension. As personal information tacit knowledge refers also to moral responsibility and emotions. Tacit knowledge functions as a counterforce between the generations. (Rolf, 1995, p. 13-14.) For the purposes of this study, it is important to remember the meanings of the musical-linguistic fingerprint (Patel, 2008) and the tonal centre (Krumhansl, 1990; Rosch, 1973; 1975; Patel, 2008) for the child's development in music, language and as a whole, supporting the child's ability to interpret and understand the world.

Stephen Brown (2000) describes a Musilanguage model to explain the connections of music and languages, constructed of the same musical-linguistic elements. The analysis of phrase structure and phonological utterances, it can be stated that music and language share a common ancestor, a "musilanguage" stage, described as five various possibilities in the model. (Brown, 2000, p. 276.)

Robert Hinde (1997) describes the interaction behaviour through the responses and their impacts on the relationships between the participants, especially on a setting with a child and an adult. The process is regulated by a) the contents of interaction

(what is done); b) how it is done; c) the versatility of interactions; d) the characteristics of various interactions; e) the qualities that are generated because of various interactions, their relational incidence and form; f) the reciprocity and the complementarity of interactions; g) the intimacy – grade of revealing oneself to the other; h) the way of discovering the other; and i) commitment to the relationship.

Knowledge and skills

A musician needs many kinds of knowledge to be able to perform or practice (Pöyhönen, 2011). The theory of multiple intelligences (Gardner, 1999) can be observed also as a reflection on many-dimensional knowledge, with the connection to tacit knowledge (Cslovjecsek, 2004): Musicianship and the mastery of it is labelled with complex processes of information, knowledge and understanding also via the processes in the underconsciousness, with the dynamic nature of knowing, and the construction of knowledge according to the time (Pöyhönen, 2011).

Mikko Anttila (2008) talks about procedural information: knowing how, skill-based knowledge: know-how, declarative, propositional knowledge: knowing that, and about learning approaches (cognition and construction) according to the understanding of information. The concept of knowledge is strongly connected to the concepts of learning – in remembering, understanding, experiencing and comprehension. When thinking of the holistic concepts of understanding of a man/learning/world, to follow the holistic concepts of Rauhala (1983), we are approaching the concept of Tacit knowledge.

Tacit knowledge

The concept of tacit knowledge (Polanyi, 1966/1983) can be considered as a central concept, when observing a human behaviour. We can think of tacit knowledge either as silence; speechless or wordless knowledge, or on the other hand refer to the concept of tacit by the understanding of information passing on within cultures, connected with practically-oriented expertise, experiential learning with no articulation or even without the possibility to articulate the information (Pöyhönen, 2011, p. 89).

In research, tacit knowledge supports the researcher with lots of challenges simultaneously faced, to pay attention to the possibilities of various types of data, and the holistic interpretation not only to hear or read the words said, but also to “read between the lines”, being present. According to Hannele Koivunen, tacit knowledge can be defined as such experiential knowledge, that is not or cannot be encoded. In communication, encoding means a set of rules to support the analyst to transform the information from one system to another. (Koivunen, 1997.)

Tacit knowledge can be described as all the skills and information learned at school, at work and during the leisure time. It includes the experiences of the life as a whole, connected with values and ethics. We learn a lot even though we are not especially taught, and also when something is not defined as learning processes. We also pass on the information on the basis of our comprehension through the behavior, attitudes, and expressions other than in words, other than to teach. Through tacit knowledge the information may pass on from one generation to another, and between subcultures and groups. This has a lot to do with musical information. It has a lot to do with human practice-oriented research.

In music, emotions are passed on and interpreted through individual experiences. This creates a ground for music education, with the aims for collective experiences to support the learner, connected with many skills and motivation. Music supports us also to remember, and to save the information in our long-term memory (Huotilainen, 2011) Sometimes tacit knowledge can be understood as a contradiction to apparent or visible knowledge – connected to the idea of the Western culture with visual nature (Pöyhönen, 2011, p. 89). We suggest this as a main orientation also to direct research and research thinking.

Professional Identity

On the ground of the experiences both as an educator and researcher at the teacher training, and in the social service's field, there is a lot to learn from each other, to recreate the training from the shared interests towards wellbeing and learning through shared experiences.

There is a special pedagogical orientation developed in Laurea UAS, called the Learning by Developing pedagogy (Raj, 2007; 2014). An application was created to better meet the school expectations (Henriksson, Korkiakangas & Mantere, 2014, p. 13). In this model the learning pathways are described in four main factors, creativity, partnership, research-oriented approach, and experiential nature. This idea was applied for the current research-based project. Please see the model in Figure 1.

The socionom professional development model was described by Ellström (1977), pointing out to the meaning of a real-life work connection as a part of the development. Please see the theory in Figure 2 below. It can, however be adopted to any professional orientation, from choosing of the professional orientation, growth towards it, and developing in the profession.



Figure 1. Laurea Learning by Developing model for comprehensive schools (Henriksson et al., 2014, p. 13)

According to the teaching profession, the fields of interaction and learning with the perspectives from curricula, methods, pedagogies, learning aims etc. provide the learner proficient tools to grip for the wellbeing-connected phenomena both at the individual and the societal levels. The holistic understanding of the society would in return support the teaching professionals in their confronting of the children and families. These both can better be reached with musical integration, supporting the teacher's ability to pay attention to learning and be present for the child (Marjanen & Cslovjeseck, 2014).

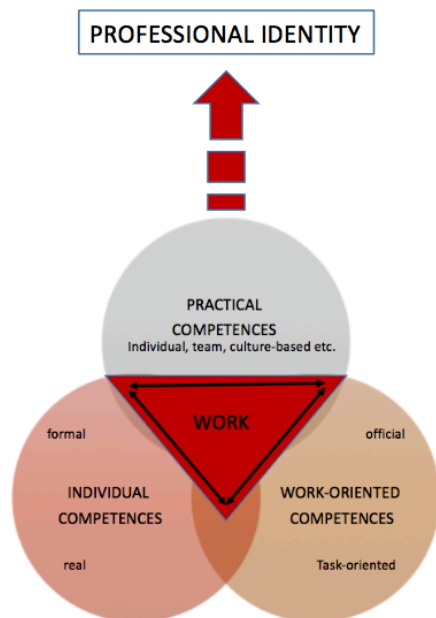


Figure 2. Socionom professional learning and growth

Music education to support the professional identity growth

Music works as a support when aiming for the creation of a positive atmosphere to support learning. Interaction is based on trust, to create a solid ground for learning. This can be considered as a fundamental reason to increase musical integration and to let the rays of sun in music (Wood, 1982) as integration touch as many as possible fields connected to learning, fostering, education and teaching.

Besides of Wood (1982), also Csire (1998) writes about the holistic impacts of music towards the human personality, supporting learning in all. Music can be used in training and education processes as a transfer agent for our consciousness; the pulse, energy and skills can be formed and practiced, simultaneously benefitting all the complex human psychological aspects. Through musical learning all the main thinking functions are included (analysis, synthesis, comparing, associating and dissociating; generalizing, abstraction, realisation and concretisation). (Csire, 1998.)

As a child's behavior, music is strongly connected to the concept of play (Järvillehto, 2014; Kurkela, 1994) – also functioning as a bridge from music to the device with the app, as the child plays it like he would play a musical instrument. Here we confront also Vygotski's (1978) Zone for optimal experience, to support our understanding of learning processes.

THE RESEARCH

The research problems and goals

In this study project, the Carnival of the Animals (COA) -app for the iPad was set as a tool for the teacher students' professional growth while also investigating the children's interaction behavior. It was asked, if the COA app would serve the students in the understanding of child-based working approaches as a teacher, while creating an understanding of the 3-4-year-old children's interaction behavior, and simultaneously serve the development of the teacher's professional identity. The factors of child behavior and interaction with research understanding and comprehension of knowledge and values were set as a focus for the current investigation. This was thought to create information for the student on learning to discuss with teaching, the COA as a tool, and also teaching technology in a wider sense, and of music, language and multisensory experiences as a framework for the interviews.

The research method

The study protocol

The study project was a part of a course on child based methodology, and it was performed as a core content for the course, with goals set on child-oriented and practice based study methods. The students were divided in five groups of four students in each, and they followed the COA study procedure (Perez & Cslovjecsek, 2013), each group collecting the data from two families during four visits.

The study protocol (Perez & Cslovjecsek, 2013) included qualitative and quantitative parts, based on four visits in families. The data was collected both as a result of the use of the Carnival App, in tracking lists, and the video evidence recorded during the visits. The students followed this protocol, including also the starting and ending interviews with the children and their parents. Furthermore, to learn about research, they created their own additional research questions.

Data

Our research on the students' learning/processes included three parts. To start with the current study, (1) the students had collected data as described in Table 1 (below), with (2) some interviews made with the students after six months of the data collection, to follow a protocol as described in Figure 3 (below). During the interview the themes, supported with the figure, were discussed by the choices and order designed by the interviewee (the child/interaction with the child;

understanding and meanings of research; knowledge and values; learning/teaching; The Carnival of the Animals –tool/technology; and music, language & multisensory experiences). After the analyses of the data made by the students and the interviews, by the researchers, (3) the dataset of one child with an active musical-linguistic behavior on the videos, was chosen for a more detailed analysis made by the teacher-researcher.

Table 1
Students' data collection schedules and children's ages in November 2015

Group	The child		Age: 11/ 2015	Sessions for data collection				
	<i>Female born</i>	<i>Male, born</i>	<i>Y:M</i>	<i>S1</i>	<i>S2</i>	<i>S3</i>	<i>S4</i>	<i>hours</i>
1A		21.9.2012	3:1	12.10.	19.10.	26.10.	2.11.	5.15 pm
1B	22.9.2012 (trackings missing)		3:1	15.10.	22.10.	5.11.	12.11.	5 pm
2A		23.3.2013	2:7	28.10.	3.11.	13.11.	19.11.	2.50-7.10 pm
2B	24.7.2013		2:3	4.11.	9.11.	13.12.	Videos missing	6.30 pm
3A		15.10.2011	4:0	21.10.	28.10.	5.11.	19.11.	8 pm
3B	26.5.2012		3:5	27.10.	4.11.	10.11.	18.11.	3 pm
4A		28.4.2012	3:6	4.11.	9.11.	18.11.	26.11.	5 pm
4B	1.11.2012		3:0	4.11.	11.11.	18.11.	27.11.	5 pm
5A		26.1.2012	3:9	18.11.	19.10.	26.10.	2.11.	5 pm
5B	31.8.2011		4:2	21.10.	28.10.	4.11.	11.11.	5.30 pm

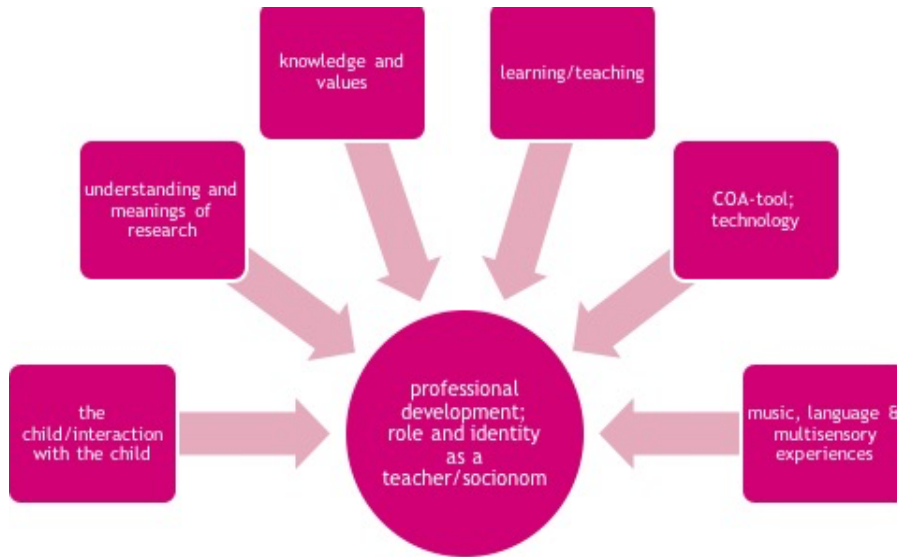


Figure 3. The structure for the students' interviews with the researcher, by the assumptions for the dialogical elements surrounding the professional development

This analysis was simply performed by adding the transcribed details with red font in between the observations written (please see in Figure 4) by the students, to find out about the difference at the analyst behavior. This way, it was possible to show the differences between the students with no musical or special research background, and the researcher, with musical and research background.



Figure 4. Video transcriptions made by the students (black font) and the teacher-researcher (red font), as a visual element to observe

The data included video and tracking data (669,89 min.), two interviews in each family and the data collecting with the 3-4-year-old children (n=10). This data was

analyzed by the groups of students, both from the quantitative (tracking lists) and qualitative (video transcriptions) approaches. Five students were interviewed (195,16 min. data) by one of the researchers six months after the study process to finalize the project. The recorded interview data was analyzed with the support of theory-based content analysis method, including the same phases for both, the students and the teacher-researcher. The theories on music and language as sounds, musical-speech and holistic interaction and the support from musical activities created an understanding for the teacher-researcher in a way, that cannot be taught only as a part of a short course, but needs a deeper learning path on music, also as experiences of music making. This was confronted in the analyzing processes, pointing out for the importance of teaching music for these students. The analyzing processes themselves followed the same procedure, writing down the talks and happenings, and the classification of those, to make conclusions.

Systematic video analysis

Systematic video analysis is widely used in qualitative research, especially in interaction studies or studies with social interests. The triangulation of data, methods, and investigators supports the results of the video analysis. The idea of the video analysis is to collect rich data from a small sample, to recreate and generate new knowledge. (Marjanen, 2009.)

As an interesting part of the data, the video materials turned out to function as a powerful tool, on the other hand for the students learning about children's behavior, and on the other hand, when looking for the abilities to analyze the child's interaction behavior with no musical training (the students) or when doing it on the basis of a musical training (the music educator & researcher). It is of course important to realize also the factor of the level of research experience when estimating this. This can be seen as Figure 4, which includes the teacher-researcher's transcription of the video data in red font, and the students' original transcriptions in black, only as a visual output.

The results

The results point out to the app being useful for the development of the students' professional identity, with strong support for the understanding of child interaction behavior, the musical, linguistic and multisensory experiences, the iPad as a tool, learning processes, comprehension of knowledge and values, and the understanding and meaning of research for the future teaching orientations. This can be observed in A) the students' learning about child behavior, directed by their own research questions, and B) the students' meta-learning about how and why doing research in classrooms.

When observing the learning results from these two approaches, it can be stated, that:

1. the possibility of creating the own research questions is fundamental for the inner motivation, as a ground for the learning processes. It supports the student to find meanings, and confront the responsibility of the process as a whole, with the importance of being present with the child while the observations. The quality of the research question comes only at a second stage, when doing the first investigations. During the process, the students will learn also about the ways to present the questions, because of the discussions with the peers and the teacher. This all supports the finding of the meanings from a wide and deep perspective.
2. On the basis of the interviews, Carnival of the Animals as a tool may support the development of the professional identity, as described in Figure 5 (below).

Musical elements and musical activities provided us with a clear construction for the observation of the interaction behavior of the children. They also made us to confront the limitations in interpreting and analyzing the data, which was not possible without the understanding or recognizing of the musical elements, or without the comprehension of the importance of the detailed analysis. The re-analysis of the video data of one child points out towards undeniable differences because of the missing education in music, and the adequate amount of research studies. They both should be supported with close interaction and supervision, also with the peer groups. Research and musical abilities are important for the professional development.

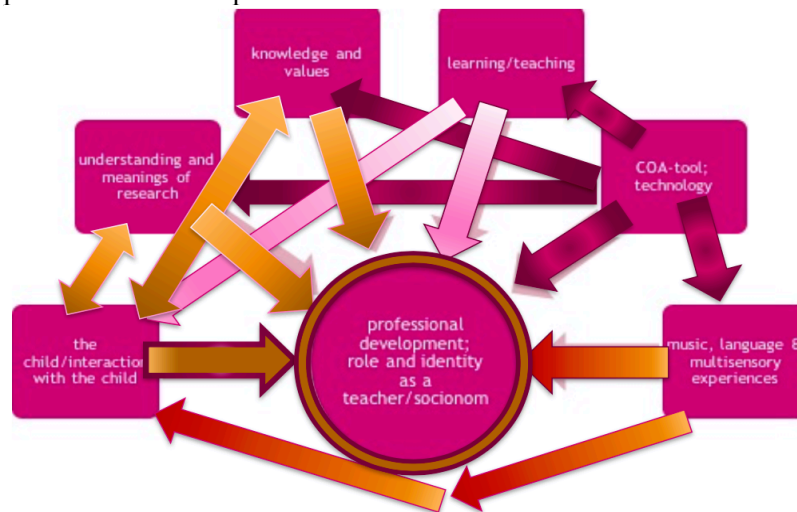


Figure 5. The Carnival of the Animal –study protocol with multiple connections as a dialogue towards a support in professional development

CONCLUSIONS

It seems to be well defined to work with the proposed framework and the tools to bring teacher students in a positive contact with questions of educational research from the aspects as described above (A & B). Their reflection seems to ground on experience that is relevant. We can assume, that the relevance comes out of their own research question, being connected with their own interests and probably as well to the next step of their development. Based on this, they start acquiring for the main research elements– reliability, validity, ethics and so on. The students need support during the process, and even before it. Further development of and designing of the materials towards the human-oriented education programs is supported.

REFERENCES

- Adams, G. (2014). The day I realized my toddler was addicted to the iPad: Three-year-old William tugged at the duvet and woke his father demanding the tablet...at 4am. *Mail online*. Retrieved from <http://www.dailymail.co.uk/femail/article-2548365/As-revealed-one-three-children-use-tablet-talk-fathers-alarming-story-The-day-I-realised-toddler-addicted-iPad.html>
- Anttila, M. (2008). *Kohti kolmannen vuosituuhannen musiikkikasvatusta. Osa 4: Luokanopettajaopiskelijat ja musiikki*. Joensuun yliopisto, 2008.
- Brown, S. (2000). The "Musilanguage" model of music. In N-L. Wallin, B. Merker & S. Brown (Eds.) *The Origins of Music*. London: The MIT Press, pp. 271-300.
- Csire, I. (1998) *Educația muzicală din perspectiva creativității*, Universitatea de Muzică, Bucuresti, România.
- Cslovjecsek, M. (2004). "Sprachenlernen mit Musik: Die Qualitäten von Musik als Werkzeug des Lernens" In: *mip-journal*, Vol. 4, 9/2004, pp. 6-13
- Ellström, P-E. (1997). The many meanings of educational incompetence. In
- Brown, A. (ed.) *Promoting vocational education and training: European perspectives*. Hämeenlinna, Finland.
- Evelein, F.G. (in press). Cooperative learning in Music: Music Education and the Psychology of Integration. In M. Cslovjecsek & M. Zulauf (Eds.) *Integrated Music Education. Challenges for Teaching and Teacher Training*. Bern: Peter Lang Editors
- Geist, E. A. (2012). A qualitative examination of two-year-olds interaction with

- Tablet based interactive technology. *Journal Of Instructional Psychology*, 39(1), pp. 26-35.
- Gordon, J., Halsz, G., Krawczyk, M., Leney, T. et al. (2009). *Key competences in Europe. Opening doors for lifelong learners across the school curriculum and teacher education*. Warsaw, Center for Social and Economic Research on behalf of CASE Network. Retrievable in http://ec.europa.eu/education/more-information/moreinformation139_en.htm
- Hinde, R.A. (1997). Etologinen teoria ja suhdeteoria. In R. Vasta (Ed.) *Kuusi teoriaa lapsen kehityksestä*. Kuopio: Kuopion yliopiston painatuskeskus, pp. 289-320.
- Huotilainen, M. (2011). Greetings from brain research – music education is important for brain development. *Proceedings of the 5th Conference of the European Network of Music Educators and Researchers of Young Children*. Helsinki, Finland.
- Järvilehto, L. (2014). *Hauskan oppimisen vallankumous* (The revolution of learning with fun). PS-Kustannus.
- Koivunen, H. (1997). *Hiljainen tieto*. Helsinki: Otava.
- Krumhansl, C.L. (1990). Tonal hierarchies and rare intervals in music cognition. *Music Perception*, 7, pp.309-324
- Kurkela, K. (1994). *Mielen maisemat ja musiikki. Musiikin esittäminen ja luovan asenteen psykodynamiikka*. (Music and mental landscapes. Musical performance and psychodynamics of a creative attitude, 2nd edition). EST-publications, 1. Helsinki: Hakapaino, Inc.
- Marjanen, K. (2016). The Carnival of the Animals – an iPad App to Support Interaction. *R&M Source. Special Issue #5*, September 2016, Pädagoogische Hochschule Niederösterreich. ISSN: 2313-1640. Retrievable: <http://journal.ph-noe.ac.at>
- Marjanen, K. (2015a). Self Organised Symposium, “Finnish six-year-olds play with ‘The Carnival’: case study two. Presentation as a part of a *The Carnival of the Animals: an international study to explore children’s interactivity with an app for Ipad*” chaired by Jessica Pérez. EECERA 25th Conference, Barcelona, Spain 07- 10 September 2015.
- Marjanen, K. (2015b). Towards the understanding of Sound Education – Music Education, Language Education and Well-Being. *CFMAE The*

- Changing Face of Music and Art Education- Interdisciplinary Journal for Music and Art Pedagogy.*
<https://cfmaejournal.wordpress.com/2015/09/01/cfmae-7-1-playful-sounds-personhood/> ISSN 2228-0715/ ISSN 2228-0723 (Online,pdf)
- Marjanen, K. (2014a). Playful Musical Activities for iPad: The Carnival of the Animals as a Support for Musical Interaction. *International Society for Music Education, Early Childhood Seminar Proceedings*, Brazil, Brasilia, 15-19 July 2014
- Marjanen, K. (2014b). Language loves music - Creative sounds as a support for interaction. *Arts, technology and cultures – From invisible to visible*. 17th of October 2014, University of Helsinki. Conference abstract and paper presentation.
- Marjanen, K. (2009). *The Belly-Button Chord. Connections of Pre- and Postnatal Music Education with Early Mother-Child Interaction*. University of Jyväskylä. Jyväskylä Studies in Humanities 130. A music education dissertation. (Retrievable in <https://jyx.jyu.fi/dspace/bitstream/handle/123456789/22602/9789513937690.pdf>)
- Marjanen, K. & Cslovjecssek, M. (2016) The design and method of the Carnival of the Animals: an international study to explore children's interactivity with an app for iPad. Symposium. *32nd World Conference of the International Society for Music Education ISME*: 24-29 July 2016, Glasgow, UK.
- Marjanen, K. & Cslovjecssek, M. (2014). Recreating the Teacher Training on Musical Interaction and Transversal Learning: in, through and with Music. *Proceedings 31st World Conference of the International Society for Music Education ISME*: 20-25 July, Porto Alegre, Brasilia
- Marjanen, K. & Poikolainen, J. (2013). *Lasten Ikihyvä - hyvinvoiva lapsi kuntapalveluissa: Loppuraportti 20.12.2012* (The Positive Equilibrium of Children – an affluent child as a part of the communal services 20th December 2012.) Helsingin yliopisto, Palmenia.
- Patel, A. D. (2008). *Music, language and the brain*. New York: Oxford University Press.
- Perez, J. & Cslovjecssek, M. (2013). *The Carnival of the Animals: a collaborative research project to explore the interactivity of 2-8-year-olds from diverse locations with a APP for iPad*. Study protocol.
- Polanyi, M. (1966/1983). *The Tacit Dimension*. Garden City, New York: Doubleday & Company.
- Pöyhönen, M. (2011). *Muusikon tietämisen tavat: Moniälykyys, hiljainen tieto ja musiikin esittämisen taito korkeakoulun instrumenttituntien näkökulmasta*.

(The ways of knowing of a musician. Multiple intelligences, tacit knowledge and the art of performing seen through instrumental lessons of bachelor and postgraduate students.) Doctoral dissertation. Jyväskylä Studies in Humanities, 164. Retrievable in <http://julkaisut.jyu.fi/?id=978-951-39-4516-9>.

- Raj, K. (2007). Learning by Developing. *Laurea Publications A 58*. Retrievable in <https://www.laurea.fi/dokumentit/Documents/A58.pdf>
- Raj, K. (2014). Learning by Developing Action Model. *Laurea Publications 36*. Retrievable in <https://www.laurea.fi/dokumentit/Documents/36%20%20Raj%20LbD%20Action%20Model.pdf>
- Rauhala, P. (1988). Holistinen ihmiskäsitys. *Sosiaalilääketieteellinen Aikakauslehti*, 25, pp. 190–201
- Richtel, M (2010). Your brain on computers: Attached to technology and paying a price. *The New York Times*. Retrieved from <http://www.nytimes.com/2010/06/07/technology/07brain.html?pagewanted=all&r=0>
- Rolf, B. (1995). *Profession, tradition och tyst kunskap*. Nora: Nya Doxa.
- Rosch, E. (1975). Cognitive Representations of Semantic Categories. *Journal of Experimental Psychology: General* 104, pp. 192-233.
- Rosch, E. (1973) On the Internal Structure of Perceptual and Semantical Categories. In *Cognitive Development and the Acquisition of Language*, T.E. Moore (ed.), 111-144. New York: Academic Press.
- Tu, C., Hao, W.D., & Hernandez, J. (2016). *Interactivities with the Carnival of the Animal App: A Quantitative Study* (submitted for review)
- Tu, C. (2016). Book chapter: A two-year study on young human's interactivity with an iPad App: The Carnival of the Animals (COA). *Music Learning across the Lifespan*, Routledge Research in Music.
- Tu, C., Cslovjecssek, M., Pérez, J., Blakey, J. & Shappard, E. (2014). Assessing the Interactivity of 3-year-old Children with an iPad App: The Carnival of the Animals. *Perspectives, Journal of the early childhood music and movement association*. 9 (3), pp. 15-18.
- Vygotski, L. (1978). Interaction between learning and development. *Mind and society*, 79-91. Cambridge, MA: Harvard University Press.
- Wenger, E. (1998). *Communities of Practice: Learning, meaning and identity*. New York: Cambridge University Press.

Wilkinson, A. (2010). *iPads as an educational tool for the prekindergarten classroom* (Unpublished master's thesis). University of St. Thomas, Houston, Tx.

Wood, D. (1982). *Move, sing, listen, play. Preparing young children for music.* Toronto: Thompson Limited.

ⁱ <https://www.laurea.fi/en/studying-and-applying/bachelors-programmes-in-english/social-services>