How Dance(Sport) Can Help to Produce Better Software

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ABSTRACT

Dancing and dancesport have a long tradition of instructions and development. Furthermore, there are many aspects of them that resemble the software development process. This work analyses their features with the intent to explore what of them is already applied in software development and what could be borrowed and applied in the future. Additionally, an investigation of the associated brain activities could be performed to gather a deeper understanding of analogies and differences.

CCS CONCEPTS

• **Software and its engineering → Software development process management**; **Software development methods**;

KEYWORDS

Software Development, Development Methodologies, Dancesport, Ballroom Dancing, Comparison

ACM Reference Format:
Irina Erofeeva. 2018. How Dance(Sport) Can Help to Produce Better Software. In *Proceedings of the 26th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE '18), November 4–9, 2018, Lake Buena Vista, FL, USA.* ACM, New York, NY, USA, 3 pages. https://doi.org/10.1145/3236024.3275436

1 THE RESEARCH PROBLEM AND MOTIVATION

Software development is a fairly new discipline that has been around for just a bit more than half a century. However, it was noticed that it has features that are similar to other, much older, disciplines practices by humans[7]. Being a dancer and programmer, I conducted a study to find out if there is a connection between areas of dancing and computer science and how this connection could be useful.

The key goals of my study are to investigate:

- What is present in the dancing disciplines that we consider that reflects existing practices of software development?
- What additional practices present in dancing could be interesting for application to software development?

2 BACKGROUND AND RELATED WORK

Ballroom dancing is a set of partner dances that are performed both socially and competitively around the world.

ESEC/FSE '18, November 4–9, 2018, Lake Buena Vista, FL, USA

ACM ISBN 978-1-4503-5573-5/18/11.
https://doi.org/10.1145/3236024.3275436

Ballroom dancing may refer to almost any type of partner dancing. However, with the emergence of dancesport[1] in modern times, the term has become narrower in scope and traditionally refers to the five International Standard and five International Latin style dances. Developed in England, the two styles are now regulated by the World Dance Council (WDC)[2] and the World DanceSport Federation (WDSF)[4].[3]

The other useful concept in this research is theory of conceptual blending or conceptual integration. This theory gained a fame by Gilles Fauconnier and Mark Turner in "The Way We Think: Conceptual Blending and the Mind's Hidden Complexities".[13]. They describe conceptual blending as a deep cognitive activity that"makes new meanings out of old." According to this study we can assume that metaphorical thinking can help to find new, unobvious solutions.

Such metaphorical approach is present in the book of Brenda Laurel "Computers as Theatre"[17], where she presents a new human-computer activity. Based on the analysis of the form and structure of the drama of Aristotle the author shows how similar principles can help to understand what people experience when interfacing with computers.

The purpose of this work is to apply the theory of a conceptual blending in comparison of software development and dancing spheres and analyse how techniques coming from dancesport can be used effectively in software development.

This is not the first work on this subject. The anonymous author of "Agile dancing. Scrum training. Is it even possible?" has already drawn a parallelism between dancing and software development [6]. In particular, she has analysed how to apply the Agile methodology[8] to her training process.

Tladi (2016) metaphorically compared Waterfall, Agile, Lean and DevOps software development to Waltz, Breakdancing and Finger-tutting[20].

There are even courses for K12 students that offer learning programming using dancing called "Coding Choreography"[5]. Abstracting to dance, students study concepts such as algorithms, conditionals, functions, loops, patterns, etc. "Bringing connections between computational thinking and what their bodies are doing."[5]

Daily et al. (2014) found that dancing helps to promote learning software development in students of grades 5 and 6 [11].

3 UNIQUENESS AND APPROACH

In history of computer science there was already examples of borrowing features from other spheres. The idea of design patterns was borrowed from the work of Christopher Alexander[9] and has been adapted for various other disciplines, most notably computer science.[12] However, it appears that noone has never deeply compared software development with such a seemingly distant discipline as dancing.

This study was organized as follows:

(1) interview dancing professionals and software developers

(2) analysis of parallelism and identification of what we can learn more
(3) validation of the findings with further interviews

4 METHODOLOGY AND CURRENT STATUS OF THE WORK

For the first stage of study 10 professional dancers and 10 professional software developers were interviewed. Interviewees were asked to fill in a Google form with two general questions:

- Describe what you do to succeed in your profession(dancing or software development)?
- What does your day consist of as a dancer/software developer?

Indeed, this is an early questionnaire that will be expanded and broadened in the future.

In the first survey people with different experience within their field: active dancers of different qualifications from the lowest (hobby) to the masters of sports of Russia, coaches, retired dancers; and programmers from 3 to 10 years of development experience, working on positions such as the company's chief technical officer, etc.

5 RESULTS

Dancing and programming are nothing more than an algorithm, a sequence of actions performed by the dancer or by the computer in a given context (rhythm, tempo, style of music, personal experience, hardware, processes, timeframe, etc.).

In dancing dancer are organized and given tasks depending on their level, experience, and achievements: the most skilled can perform harder activities - the higher dancer's class - the richer is the list of allowed figures and dances. The same approach is present in software industry, where specialists are divided into "junior," "intermediate," and "senior" developers.

If you are just starting to dance, you will learn faster to dance if you exercise with a more experienced, professional partner. In ballroom dancing for this purpose there is even a special Professional-Amateur category. This helps the beginner to learn the material more quickly and correctly. And it is also useful for professional to consolidate knowledge and understand the material deeper. A similar practice is also present in the lessons with the coach, when, during the explanation of the technique or movement, he gets into a pair with one of the dancers, which facilitates faster mastering of the material via practice. In software development this is nothing else than pair programming between a beginner and a more experienced developer, which helps the beginner to learn faster [10, 14].

The leading role in the dance pair is always taken by the man. The appointment of a leader in a pair, who chooses strategy in a difficult situation, helps prevent errors on the dance floor. Error prevention in the way of choosing a leader in a team is present in software development in a role of team leader and also project manager.

But you also can start learning not only with teacher, there are a lot of books [21][19][16] that describe every dance. In these books you will find explanation of every dancing figure step by step and variations quite like what is present in the book of architectural patterns[9] by Christopher Alexander.[12]

The most common practice in ballroom dancing is recording performances at competitions not only for memory, but also for analyzing the mistakes and revealing the work front for the following workouts. In software development it is called *retrospective*.[18] Not every team runs retrospective sessions, but every team should, because this is the way to find out what we can do to be better.

Lean software development is defined as a systematic method for waste minimization within a manufacturing system without sacrificing productivity [15]. One of it's main concepts is elimination of waste, which is one of the most effective ways to increase the profitability of any business.

This sign is also evident in ballroom dancing. First, all dancers should dance both programs - Standard and Latin - but after they have reached a sufficient level, they have the ability to choose one program and develop in this direction, which gives them the opportunity to concentrate on one goal.

In ballroom dancing, training sessions are divided into individual and group with the coach. In group classes, couples of different ages and levels can train together, during such training sessions the coach can ask all pairs to exchange partners, for example, in order to work out the leading, so boys will learn to lead any girl, and girls - to listen and follow to any boy, this will make the dancer more versatile and will help to identify errors that could not be seen while training with your partner. Absolutely the same as in programming, when we test the work of the program, running it with various inputs.

For now a lot of similarities between spheres of dancing and software development were present, but what are features, that take place in dancing and can be useful in software, but not yet represented?

There are also concepts commonly used in the sphere of ballroom dancing, such as warm-up, constant work on basic movements, proper nutrition, proficiency in foundations of the classical dance. And these ideas will be the central for the further study.

6 CONCLUSION

After analysing the similarities between dancing and software development we will move on with the proposed plan - to analyse in deep features from dancesport that are applied or applicable in software development and to see the extent to which they can be concretely used, with the help of interviews with professionals. Being located in the city of Innopolis, the plan is to interview developers from the local companies; give the past experience it is likely that a significant amount of responses will be collected, so that suitable statistics could be built.

Furthermore, in exploring this study further, it would be important to go deeper into the analysis of the brain. For example, compare impulses during dance classes, perform a learned composition and implement the algorithm just explained.

ACKNOLWEDGEMENTS

We thank Innopolis University for sponsoring this work and the studies of the author.

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