Academic Presenter:
a New Storytelling Presentation Software for Academic Purposes

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Abstract From the dawn of civilization, people have used folktales and stories to share information and knowledge. After the invention of printing in the 15th century, technology provided helpful yet complicated utilities to exchange ideas. In the present computerized world, the art of storytelling is becoming more influential through the unprecedented multimedia capabilities of computers. In this article, we introduce a state-of-the-art presentation software by which academicians can present nonlinear topics efficiently and sharpen their storytelling skills. We show how the proposed software can improve the scientific presentation style. We conducted a survey to measure the attractiveness of proposed utility among other alternatives. Results show that academicians prefer the proposed platform to others.

Keywords Storytelling · Mind-mapping · Whiteboard animation · Academic presentation · Presentation software.

1 Introduction

A well-told story can be memorized and recalled quickly. People tend to learn better when the data is transformed into story, and this is the reason societies pass on their values by means of stories to the next generations. As is expressed by Gershon and Page (2001), a story is worth a thousand pictures since an image can talk about a single moment but a story can express the sequence of events. Therefore, developing storytelling skills has a great value. Baccarani et al. (2015) claims that storytelling skills can persuade listeners to feel more involved.

Advantages of storytelling induce researchers to exploit storytelling techniques for presentation and educational purposes. For instance, Pletinckx et al. (2003) examine the performance of an interactive storytelling system for a public archaeology heritage presentation in Belgium. Gatto and Pittarello (2014) create a novel software architecture that couples 3D representation and storytelling for creating engaging linear narrations that can be shared on the web.

The process of information visualization can help us to provide meaningful information for viewer. However, visualization problems can become challenging due to the complexities such as extensive data volumes (Bai et al., 2009). Bai et al. (2015) address the necessity of solving high complexities with visualization problem to relieve the intrinsic limitations of human cognitive capacity and information processing ability. They suggest applying storytelling in the field of information visualization can lead to better information presentation.

Presenting scientific papers requires different qualifications than presenting general topics (Davis et al., 2012). In this study, we introduce new presentation software by which academicians can augment storytelling skills and present nonlinear topics efficiently. Afterward, our proposed software will be called Academic Presenter.
The remainder of the manuscript is organized as follows. Section 2 reviews the history of available software products and introduces the proposed software. Section 3 addresses issues related to a scientific presentation that have not previously been completely solved. Section 4 also suggests our solution for each problem. Section 5 studies the attractiveness of the proposed software among common presentation utilities. Finally, Section 6 concludes.

2 Related Work

In this section, we begin with the history of current presentation utilities and discuss the associated advantages and disadvantages of each style. Following this, we introduce the proposed software solution that creates a new paradigm in modeling visual contents by combining previous methods.

2.1 Conventional Presentation Utilities

From the early stages, multimedia capabilities of computers exhibited a suitability for demanding tasks such as presentation (Keckler et al., 2011). Initially, Presenter was released by Forethought (Gaskins, 1984) and in 1987 it was renamed PowerPoint. Microsoft embedded PowerPoint in the Office suite in 1990. PowerPoint has been designed to create linear presentations through slides. Because of high accessibility, it gained acceptance in academia (Pippert and Moore, 1999). Del and Theresa (2001) show the positive effect of creating presentations with PowerPoint on students’ grades. However, Susskind (2005) claims that PowerPoint won’t affect academic performance but enhance students’ attitudes and self-efficacy about the course.

Gradually, high accessibility and linearity create issues, especially in universities (Tufte, 2003). Speakers create slides merely to present rather than focusing on their messages. Using slide-based presentation software together with students’ lack of experience deteriorates students’ organization skills. Also, the linearity of slide-based software products forces the presenter to simplify sophisticated subjects to a set of bullet items which is misleading for decision-making (Tufte, 2006). Moreover, a linear presentation is not suitable to illustrate the complexity of an issue; nonetheless, Spicer et al. (2012) tried to find a solution for this issue by using a directed graph structure approach.

Another movement in computer graphics started concurrently with slideware. In November 1996, Macromedia released the first version of Flash. Flash is a canvas-based presentation tool that supports vector-based animation. Canvas is like an infinite and borderless workspace in which building blocks form a presentation. Unlike slide-based technology, canvas-based technology offers enough flexibility to create nonlinear presentation yet, it was difficult to create a presentation with Flash since it required programming skill. Nowadays, new companies such as Prezi (Perron and Stearns, 2011) are trying to simplify canvas-technology for building presentations; however, this simplification may confine flexibility. Prezi demonstrates positive results in classrooms (e.g., Brock and Brodahl, 2013; Anderson et al., 2013; Spernjak, 2014).

Table 1 categorizes available presentation software with respect to employed technologies and price. The first and second columns indicate whether the product is canvas-based or slide-based, respectively. The third and fourth columns determine the availability of the corresponding product as a web application (online) or conventional software (offline). Finally, the last column shows which one is free.

| Name              | Canvas | Slide | Online | Offline | Free |
|-------------------|--------|-------|--------|---------|------|
| Adobe Flash       | ✓      | ✓     | ✓      | ✓       | ✓    |
| MS PowerPoint     | ✓      | ✓     | ✓      | ✓       | ✓    |
| Prezi             | ✓      | ✓     | ✓      | ✓       | ✓    |
| Keynote           | ✓      | ✓     | ✓      | ✓       | ✓    |
| Google Slides     | ✓      | ✓     | ✓      | ✓       | ✓    |
| PowToon           | ✓      | ✓     | ✓      | ✓       | ✓    |
| Academic Presenter| ✓      | ✓     | ✓      | ✓       | ✓    |
| SlideDog          | ✓      | ✓     | ✓      | ✓       | ✓    |
| Slideshare        | ✓      | ✓     | ✓      | ✓       | ✓    |

* Academic Presenter supports online presentations of the designed projects on the offline program.

As one can see, only two presentation tools offer both canvas-based and slide-based technologies simultaneously. Additionally, the table imply that canvas-technology is less popular than the others, although among all presentation utilities, Adobe Flash and Prezi are known as revolutionary products. In this table, we added Academic Presenter as well.

2.2 Proposed Software Solution

Academic Presenter combines the potency of slide-based presentation software products with canvas-based Users
can switch between two common presentation trends based on the level of details; for introducing general topics, they can employ a nonlinear flow and switch to a conventional linear presentation for exhibiting details. Figure 1 depicts a sample in which we used both nonlinear and linear flows. From (a) to (b) and then from (b) to (c), a user can zoom, pan, and rotate by using mouse or touch-screen. However at (d), a linear flow can carry the talk to the next topic where the user may switch to a nonlinear flow again. Thanks to the vector-based canvas of Academic Presenter, zooming into a particular region will not affect contents’ quality. By taking the advantage of proposed framework, the users can combine even mind-map diagrams and conventional slides. Chou et al. [2015] investigate the effectiveness of various digital presentation tools (more specifically PowerPoint and Prezi) on students learning performance. Their results show that Prezi is a more efficient instructional medium for knowledge acquisition compared with traditional instruction; however, PowerPoint demonstrated instructional effectiveness on only the long-term learning retention of the students compared with traditional instruction. Hence; combining the power of slideware (such as PowerPoint) and a canvas-based product (such as Prezi) can enhance the effectiveness of current digital presentation tools in universities. Although Table 1 indicates that SlideDog is also offering both presentation technologies, the user has to create PowerPoint and Prezi projects separately in the mentioned tools.

Our proposed software also enables users to build an engaging presentation by combining different types of audio visual contents: including image, audio, video, vector-based shape, PDF document, LaTeX code, and handwriting. Because Academic Presenter harnesses the power of a video graphics card without an intermediary, it is faster. Figure 2 shows the interactions among the video graphics card and application to play a video. The bottom line is that Academic Presenter is free software, which makes it an interesting option for students on a tight-budget. In the following sections, we focus on the application of storytelling techniques on a common scientific presentation.

3 Application of storytelling techniques on a Scientific Presentation

In the first subsection, we propose applying mind map diagrams for presenting a typical literature review, and we explain how Academic Presenter can help academicians with this. Next, we demonstrate how using animation and storytelling techniques can assist infographics to be more clear and informative. Finally, the effect of Academic Presenter’s whiteboard animation on teaching quality will be discussed.

3.1 Literature Review with Mind-map

In any scientific presentation, researchers have to review and discuss published information. Literature review both summarizes and synthesis important information. Unfortunately, common methods to deal with literature review are as follows:

– Listing the most relevant papers as bullet point items. 
– Organizing published information inside tables and comparing them with respect to some criteria.

Indeed, these ways of organizing information are not mind-friendly since listeners have to digest and categorize information simultaneously. However, the presentation time is not enough for both thinking deeply and listening carefully. Vector-based canvas of Academic Presenter offers another way of organizing information; using mind-map diagrams. Mind mapping has been defined as “visual, nonlinear representations of ideas and their relationships” (Biktumirov and Nilsson 2006). Mind-map is also considered as a powerful diagramming tool that plays a significant role in collaborative or group storytelling (Nakamura et al. 2010). Liu et al. (2011) demonstrate the benefits of mind mapping (concept mapping) on students storytelling skills.

By using mind-map, viewers can categorize subjects and find their relationship with the main topic. For example, Figure 3 depicts the literature review of a deregulated electricity market using a mind-map diagram. From the central topic toward each branch, more details are added to the parent nodes; thus, doing this provides classification rule to categorize subjects. Each branch ends with a red node containing studies similar to the attached branch. This categorization method is easier to memorize and recall (Farrand et al. 2002). Moving from one branch to another, a presenter begins by discussing general topics and finishes with more technical information; therefore, viewers might be less likely to lose concentration as a result of listening to details for a long duration. As mentioned, Academic Presenter supports both slide-based and canvas-based technologies; therefore, a presenter can switch to slide-mode to explain linear topics inside each node. Interested readers will be invited to watch “Why Academic Presenter?” (Part 1 - Literature Review) for more details.

3.2 Animated Infographics

Information graphics (or infographics) is an innovative medium to visualize data clearly and in an engaging manner. Infographics are enchanting storytelling tools for transforming data into knowledge, as they capture a reader’s attention by utilizing principles of graphic design. These characteristics

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4 https://youtu.be/LUWr8pqJJzg
assist infographics to be highly popular for transferring data to diverse audiences (Bateman et al., 2010; Borkin et al., 2013).

However, packing all data and information in a single image can cause a sense of confusion since people may not see the patterns clearly. Harrison et al. (2015) examine the impact of color and complexity on impression level of audiences and conclude that participants reacted differently to infographics due to the difference in age, educational background, and gender.

A solution to this problem is using timeline animation instead of a single image. Therefore, viewers are gradually becoming familiar with the presented data. The combination of keyframes and infinite canvas in Academic Presenter help designers to prioritize different sections of infographics and add animation to static infographics. Figure 4 displays a sample in where static infographic is converted to an animated one. In Figure 4, the leftmost image is static but the right panel is showing the development of the story with time. Note that designers can zoom and pan in each keyframe to recommend a viewport to audiences.

3.3 Effect of Handwriting

Although typing by computer is easier than writing by hand, there remain many debates about the constructive effects of writing by hand on learning (Longcamp et al., 2005). Pinola (2011) explains why writing by hand can assist learning. There is anecdotal evidence that dynamic sketches together with narration may be more efficient for delivering information than traditional presentations (e.g., Dean, 2006; Roam, 2009). Consequently, researchers invent new teaching aids compatible with this storytelling technique. For instance, Lee et al. (2013) propose a new narrative visualization (specifically whiteboard animation) device that uses pen and touch interactions to leverage the narrative storytelling attributes. Results confirm that the audience is more engaged by presentations that done with offered tool than PowerPoint. Besides, writing by hand allows more flexibility to the writer, especially in abstract courses such as mathematics. Nowadays, many educational websites are using whiteboard animation technique to teach various topics (e.g., Moffit and Brown, 2015; Royal Society for the encouragement of Arts and Commerce, 2015).

In spite of progress in teaching instruments, many professors still prefer to teach by writing on a board. However, by looking at the entire academic career of a professor, one might infer that s/he often teaches almost the same materials each semester to different groups of students. We suggest employing digitizer to utilize the advantages of writing by hand yet alleviate the repetition issue. Nowadays, digitizers are becoming an indispensable part of any computer. Users can record their hand movements on screen by using digitizers. The information which can be retrieved from digitizers is as follows: 2D-position, pressure level, starting time, finishing time, and color. Each time the user draws a line (stroke) on screen, the digitizer records the position of the digitizer’s tip on screen and pressure level. The pressure sensitivity of all digitizers is not the same, but even low-quality digitizers can sense the pressure accurately enough to emulate the movement. Figure 5 shows effect of neglecting pressure on a stroke. Figure 6 illustrates the employed data structure. The stroke collection consists of strokes and each stroke corresponds to one curve on the canvas.
Academic Presenter utilizes a digitizer in presentation, not only to annotate on screen but also to replay the handwriting wherever is necessary. In toolbox, a handful of different pens and highlighters is available at users’ fingertips. Figure 7 displays the handwriting toolbox. Every movement is editable and precise. Also, user can increase animation speed to save presentation time. We redirect an interested reader to watch “Why Academic Presenter? (Part 5 - Handwriting)”5 for more details.

5 https://youtu.be/U-oNFjBtzfE
4 Analyzing the Attractiveness of Academic Presenter

Academic Presenter is designed for academic environments since presentation has educational and inspirational nature. Potential users are students of universities, teachers in high school and professors. Because our focus is to solve presentation problems related to academic environments, we tried to find flaws in current tools which affect the presentations the most. To analyze the future position of Academic Presenter in academia, we exploit Analytic Hierarchy Process (AHP) method (Saaty, 1988); therefore, we define four criteria: Price, Number of users, Simplicity, and Applicability in academia. We collect quantitative information such as price and number of users from the websites and documents; however for qualitative criterion such as simplicity, we asked from experts in the field of presentation. We select the most significant competitors. The alternatives are listed as follows:

- Office 365 (including PowerPoint) is the brand name adopted by Microsoft for a collection of software plus services subscriptions that provides web-based productivity software and services to its subscribers.
- Prezi is a cloud-based storytelling tool for presenting ideas on a virtual canvas. The product employs a zooming user interface, which allows users to zoom in and out of their visual contents, and enables users to navigate through information within a 2.5D space on the Z-axis.
- SlideShare is a web-based slide hosting service. Users can upload PowerPoint, PDF, and Keynote files privately or publicly. Slide decks can then be viewed on the site itself, on handheld devices or embedded on other websites. SlideShare is considered to be similar to YouTube, but for slide shows.
- PowToon is a cloud-based for creating animated presentations and animated explainer videos.
- emaze is an online presentation platform built on html5 technology. Users can create, manage and share their presentations through their cloud-based system. It offers 3D animations and video backgrounds.

The retrieved information from competitors are displayed in Table 2.

As one can perceive from Table 3, applicability in academia is calculated based on availability of essential features that may help students and professors during their presentations. Also, there are some features with half the unit value for some alternatives which means mentioned feature is not provided at a satisfactory level.

Furthermore, we invite users to judge about the importance of each criterion. A group of 50 people have attended in a questionnaire. The composition of the attendees are as follows: graduate students 54%, undergraduate students 20%, and instructors 8%. Figure 8 delineates the detailed information of the participants on a pie chart.

The resulted judgements are reported in Table 4. Based upon pairwise comparisons, applicability is the most influential factor. The inconsistency of judgement matrix is 1% which is in acceptable range.

AHP estimates Academic Presenter’s position among competitors regarding retrieved information and pairwise judgements (see Figure 9).

As one can see in Figure 10, Academic Presenter had better off in term of price. Sensitivity analysis of our result is showing that Academic Presenter’s rank is relatively stable on simplicity and applicability. Although Academic Presenter is showing a promising rank among other alternatives, yet the difference between Prezi, Office 365 and Academic Presenter is negligible.

5 Conclusion

Presenting scientific papers need different requirements than presenting general topics. Most of available software solutions are adjusted to meet business presentations’ demands. However, presenting a nonlinear scientific subject is beyond their capabilities. In this paper, we presented a new presentation software that facilitates delivering nonlinear topics. Our
free presentation software enables users to enhance their storytelling skill. Users can switch between two common presentation trends based on the level of details: for introducing general topics, they can employ a nonlinear flow and switch to a conventional linear presentation for exhibiting details. Also, we introduce new components in the presented software solution that may help academicians to teach abstract courses more efficiently. Finally, a survey is conducted by asking eligible attendees to prioritize different aspects of a presentation utility. We exploit Analytic Hierarchy Process method to analyze the expected rank of proposed tool among popular alternatives. The results are indicating that the proposed software is more attractive than current software solutions.

Although the proposed utility is the combination of slide-based and canvas-based products and researchers investigated on each technology separately, assessing the effectiveness of proposed tool on the knowledge acquisition of students is a valuable future work.

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| Criterion       | Price | Num. of users | Applicability | Simplicity | Weight |
|-----------------|-------|---------------|---------------|------------|--------|
| Price           | 1     | 1.223         | 0.820         | 0.888      | 0.241  |
| Num. of users   | 0.818 | 1             | 0.670         | 0.670      | 0.193  |
| Applicability   | 1.220 | 1.492         | 1             | 1.084      | 0.294  |
| Simplicity      | 1.126 | 1.377         | 0.923         | 1          | 0.271  |

Table 4: The relative importance of each criterion

![Fig. 8](image.png) The detailed information of the attendees in the survey

Overall inconsistency = .01

| Alternative | Academic Presenter | Office 365 | Prez | SlideShare | enavate | PowToon |
|-------------|--------------------|-----------|------|------------|---------|---------|
|             | .154               | .085      |      | .175       | .164    | .085    |

Fig. 9: Alternatives’ ranking based on AHP method

Compliance with ethical standards

Conflict of interest This study was self-funded and no conflict of interest exists.

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Fig. 10 AHP ranking of alternatives considering for each criterion

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