An Interactive E-Learning Authoring Tool for Online Course Creation: Utility, Challenges and Opportunities

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Abstract

eLearning has been widely adopted as a mode of transaction for curriculum developers for a wide range of educational purposes. It allows for flexibility and scalability and can be incorporated into any engineering program's curriculum. This modality was a global necessity during a difficult time in human history and with it came significant challenges for faculty who were forced to determine the best approach for course instruction to overcome technological and social issues within the classroom. With the mandate for e-learning being of the past, the tools explored for e-learning still have significant utility for online (even if temporarily for class cancellations), hybrid, and even face-to-face class instruction. Therefore, the purpose of this paper is to provide insight into the authors' approach to creating interactive online courseware by using Articulate Storyline 360® for the enhancement of online course engagement. Storyline 360® is aimed at providing tools that have a primary goal of making interactive activities rather than one-way presentations. It has a plethora of design tools and activities such as embedded quizzes, surveys, and other interactive features. The authors found a variety of benefits of Storyline 360® such as a user interface reflective of other slideshow products, the ability to set up quizzes, activities, and certificates of completion within the course, the text-to-speech functionality, and other benefits. It also allows for easy publishing into an institution's current LMS using the Shareable Content Object Reference Model (SCORM) format. There were a few undesirable features and challenges with the software such as the proprietary file types for low interoperability, robotic text-to-speech, the cost, and a few other logic-oriented issues. A review of the completed course by education and industry professionals revealed satisfaction with the course, appreciating the engagement of the course with commentary limited to course content. In general, the authors found great utility with the use of Storyline 360® where the benefits outweigh the undesirable features and challenges and suggest engineering educators consider the use of Storyline 360® for online instruction, hybrid classes, flipped-classroom environments, or other useful curricular applications.

Introduction

eLearning has emerged as a powerful mode of delivery for a variety of educational purposes. It allows for flexibility and scalability and can be incorporated into any engineering program's curriculum. This modality was a global necessity during a difficult time in human history and with it came significant challenges for faculty who were forced to determine the best approach for course instruction to overcome technological and social issues within the classroom [1][2].

With the mandate for eLearning being of the past, the tools explored for e-learning still have significant utility for online (even if temporarily), hybrid, and even face-to-face class instruction. With instructional staffing challenges in engineering, the need for innovation, and the desire for learners to engage in bite-sized learning modules such as micro-credentials [3], faculty have a unique opportunity to take advantage of the various authoring tools that have been developed or enhanced out of necessity to engage in eLearning approaches to complement and revise classes or to provide offerings to students that will not fit within the curriculum.

Problem & Purpose

With the ability to provide alternative means of instruction, instructors need to understand what works best for their instructional purposes. The authors faced this challenge when creating a micro-credential on a particular safety topic. Faced with this challenge, the authors sought advice from an instructional designer and suggested course development via interactive software to meet our needs. With this, the purpose of this paper is to share the utility, challenges, and opportunities experienced by the authors when using Articulate Storyline 360® [4] (Storyline 360) as the authoring tool for a course.

Authors' Guiding Framework for Courseware Development in General

To understand our decision-making about the course in general, we needed to address all necessary curriculum components and frame the course development process theoretically. Thus, we used Eash's [5] curriculum components which include: (a) a framework of assumptions about the learner and society; (b) aims and objectives; (c) content or subject matter with its selection, scope, and sequence; **(d) modes of transaction**, and (e) evaluation. These components "must all be well-coordinated for the organism [curriculum] to live and develop; yet they may be separated for purposes of description, study, and research" [5, p. 67]. Online instruction was the mode of development because of the assumptions about the learner. In addition to this, we wanted the instruction to be as interactive as possible in an online learning environment, and Storyline's platform allowed for this.

The eLearning Authoring Tool - Articulate Storyline 360

Articulate Storyline 360 is an "authoring tool designed for the creation of interactive eLearning resources" [6] which allows educators to create interactive instructional material. It has been used in several fields of study such as academic integrity [6,7] and water management [6,8] and via different modalities for flipped classes [6,9] and fully remote learning [6,10].

Storyline 360 operates similarly to a more commonly known slideshow presentation software and allows instructors to develop a slide deck that can be grouped into various scenes via a *.story* file type. This *.story* file can then be published into various Learning Management Systems (LMS) such as Canvas or Blackboard for courseware development by exporting a SCORM (Shareable Content Object Reference Model) format. Alternatively, content developed in Storyline can be used to create HTML content for use on websites. Content developed in Storyline 360 allows the learner to access the created course content on a desktop computer/laptop, a tablet, or a cell phone with the same quality on each device providing more accessibility to the learner.

Instructional Capability

As an educator, the Storyline 360 platform has many useful functions. By using the design tools, educators can incorporate all the functionality of software such as Microsoft PowerPoint ®, with added features that the authors have used such as:

- Adding human-like avatars and characters with varying positions and expressions into scenes from their database.
- Adding 2-D and 3-D images from their media library that do not require purchase or attribution.
- **Adding interactive objects** to scenes such as buttons, sliders, hotspots, markers, etc. which allows for engagement with the content.
- **Setting triggers for slides and objects** allows for control of the flow of the course.
- The text-to-speech function which can be generated in Storyline 360.
- **Incorporating educator-generated audio** with closed caption generation and editing.
- Generating quizzes and tests for use within the course

Author's Experience with Storyline 360 Utility

The Process of Creation and Developer Interface

The user interface for Storyline 360 is easy to navigate and intuitive for those who are familiar with other slide-based presentation software. The core of Storyline 360 is the story view (See *Figure 1.*) which allows instructors the ability to provide a pathway for each course module, i.e., limiting access to the next module before beginning another module. An example of the utility of this is that if a learner is unable to pass a quiz, they cannot move forward and may have to restart the module to attempt the quiz.
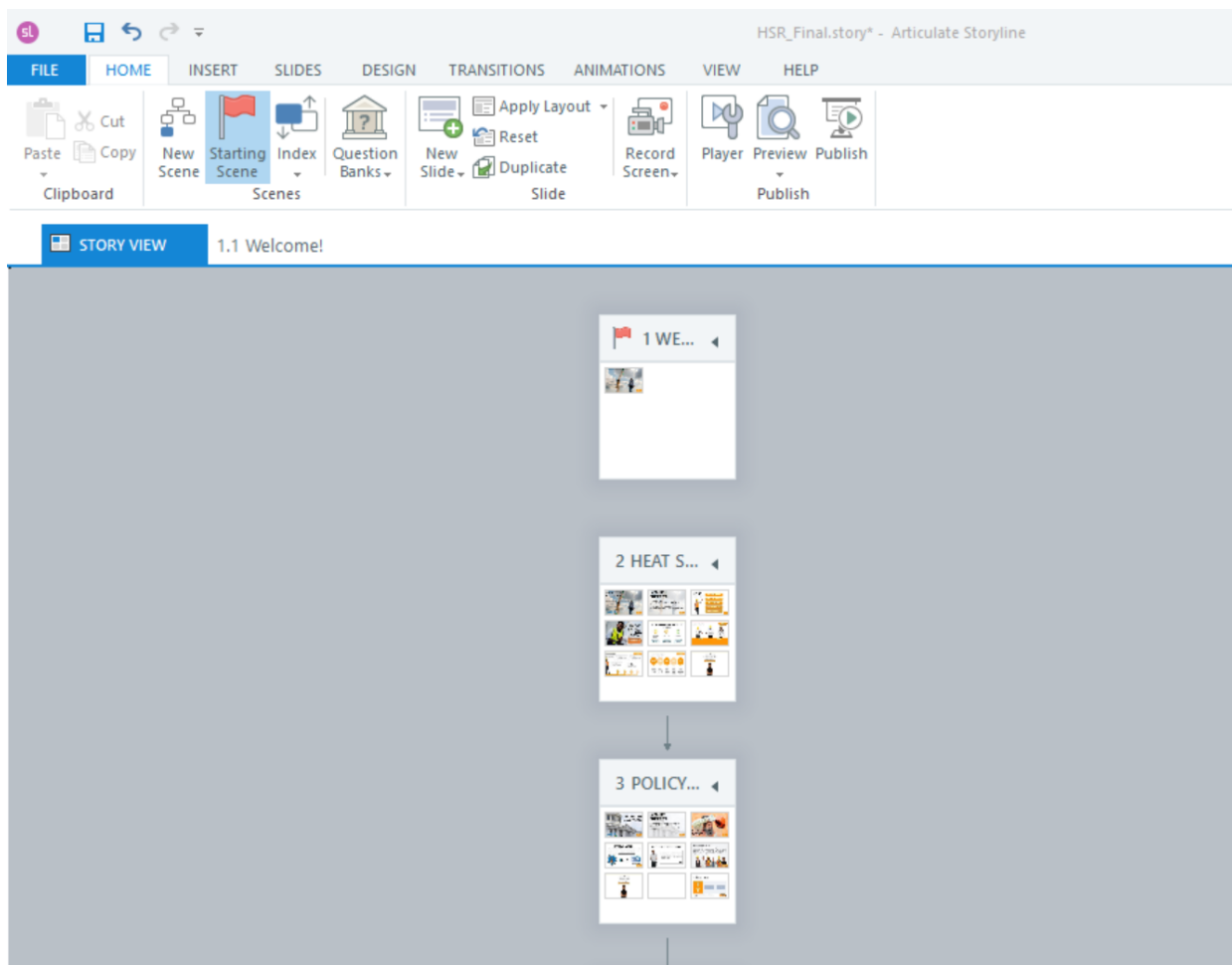
Figure 1. "Story View" provides a list of separate course modules.

Individual scenes were set up to create a "story" which is essentially a course module. The collection of scenes made our course, i.e. introduction, topic 1, topic 2, etc. Once our "story" was organized, we began modifying your module with a scene. In our scene view, we were able to develop our module based on predefined content.

1. *Building the Slides*

In each module, we created an introduction slide (for the topic), and an objectives slide, and based on the level of interactivity and the content that needed to be covered, we built slides from the ground up by adding characters from the media library, interactive buttons from our toolbars, and textboxes, etc. for any narrative/readable content we wanted to add. The organization tree guided the slide deck flow for the module or scene. Additionally, we were able to use slide layers to manage our project flow, but setting up triggers was our main approach to ensure our scene flowed properly. An example of the scene view can be seen in Figure 2.

2. Slide and Object Triggers

What made Storyline 360 so unique was the ability to set up triggers to set up object and slide actions and restrict flow within the course. For example, if we set up a timeline for our project that lasted 30 seconds, we were able to disable buttons on the screen (serving as the only means of progressing through the scene) until the timeline ended. Also, as reflected in Figure 2, the buttons shown each had to be reviewed (with restricted timelines on the content) before the "DONE" button became available. This was the only means of progressing past this segment of the course.
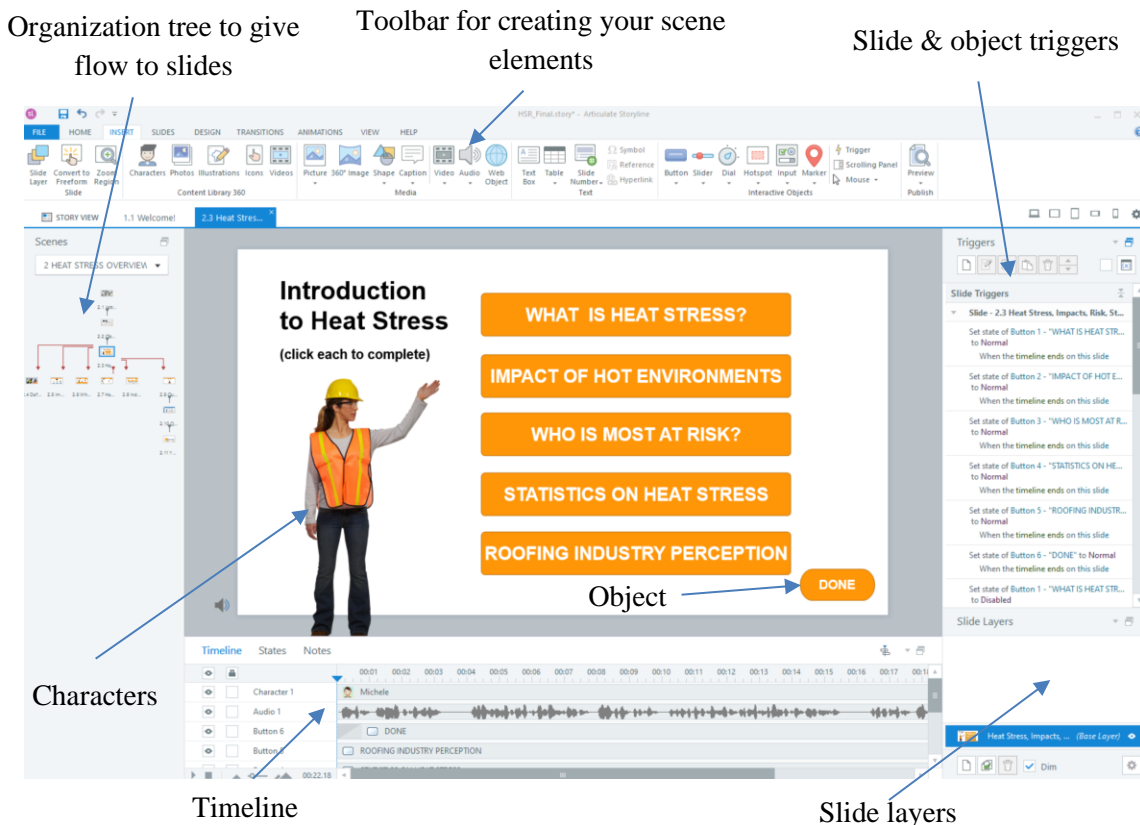

Figure 2. Scene View for Content Creation

3. Timeline & Audio

The timeline feature was also a very useful instructional tool that differs from traditional software. The timeline feature showed all the different elements that would be incorporated into the 'slide'. For example, as shown in Figure 2., there is an element labeled 'Audio 1' with an audio wavelength – this is a recording that plays while this slide is in view. This audio can be done as text-to-speech within the software or a voice recording by the instructor. The authors elected to use a natural text-to-speech voice generator called Speechify [11] as a voice-over to reflect the character within the module. Closed captioning was also incorporated within the

software for accessibility. The authors found Storyline 360's text-to-speech voices to be too robotic.

4. *Evaluation & Certification*

Evaluation for the course was done via quizzes for each module generated from question banks within Storyline 360 and via a final test that users were required to complete to receive a certificate of completion (the content of the certificate removed for this paper) as shown in Figure 3. A set of questions was generated for each module (scene) that were multiple choice; however, there are many question types available [6]. Randomly selected questions as part of the test bank for each module were used to generate questions for the final test. A score of 70% was set to receive the certificate of completion otherwise the learner must retake the quiz/review previous content.
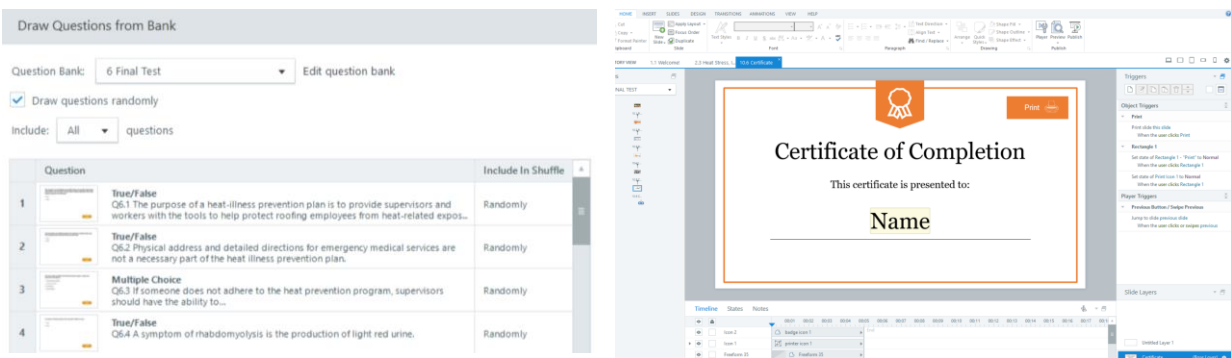

Figure 3. Quiz question bank and certificate of completion

5. *Previews, Player & Learner Interface*

A unique aspect of Storyline 360 is the ability to make changes to the course player and to preview what the learner's experience will be. As an iterative process, the authors continuously used this feature as a quality control method in our course development. This helped with the organization and proper management of our triggers. Figure 4 provides the preview of the learner interface below with the left pane showing the content areas within the scene and the quiz at the end.
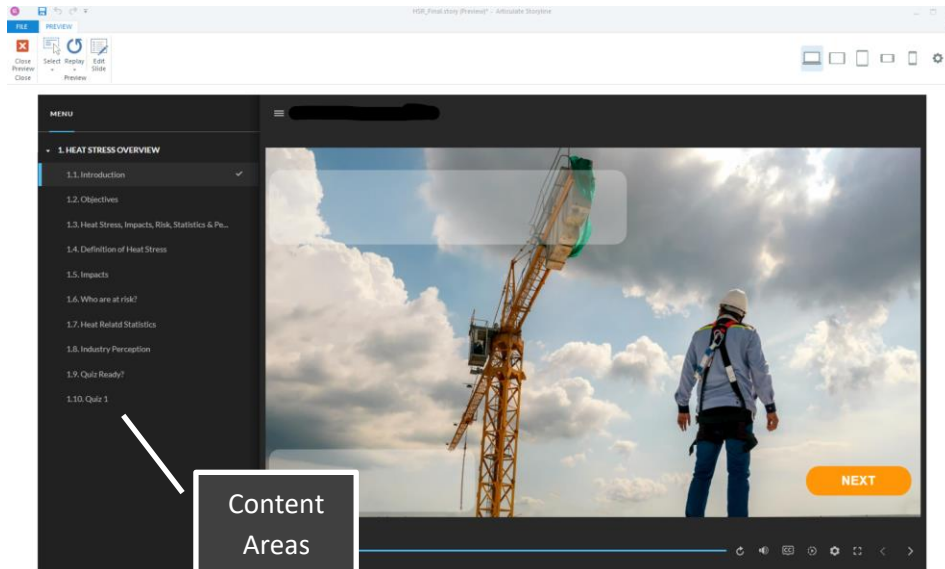
Figure 4. Preview of the learner interface

Challenges & Other Considerations

Stability, Support & Other Resources

As other researchers have found [6], the software at times can lag a bit especially when generating previews of scenes, this with a PC having 16GB RAM and a 13th Generation Intel® Core ™ i71365U processor. Also, file stability tended to be an issue when editing files stored on cloud drives such as Box or Google Drive, even when their folders were installed on our PC. It causes the software to crash every so often; therefore, we had to build the course locally on our PC and then upload it to cloud storage for safekeeping.

Also, sharing a single *.story* file amongst multiple users created issues associated with the file, button, and trigger associations and loss of content when shared. With the *.story* file type, there is limited interoperability among different authoring platforms. In addition to this, due to the amount of content being built into the software, the *.story* file size can be quite large depending on the size of the files you are embedding. Lastly, there is a learning curve to utilizing Storyline 360 especially with properly setting up triggers and some of the activities, this was found to be frustrating at times.

Outside of Storyline 360 is an array of complementary software such as 'Speechify' to enhance your course development. Beyond this, there are many templates available online that are easy to import into your story so you will not have to build courseware on your own. As an example, the certificate of completion template with associated triggers is shown in Figure 3. was found on Articulate's community website. It certainly simplified the process of online courseware development.

Storyline 360 Cost

Another challenge is overcoming the cost. Storyline 360 costs $549 for a personal academic plan and $699 for the "Teams Plan" for academic institutions; however, this is per user on an annual basis. If done independently, this cost increases by 50% to $1,099 for the personal plan and $1,399 for the "Teams Plan". There is a 30-day trial offered that allows full access to the functionality of the software to try it out before purchasing [4].

Discussion & Conclusion

Opinion & Opportunity

Upon completion of the course, a group of academic and industry professionals reviewed the course and found it to be a unique and engaging course experience and were very pleased with the results. The interactive nature of the course and the ability to restrict access and provide a certificate of completion were attributes of the course that were appreciated.

With the need to continuously capture the attention of the learner while ensuring that content is focused on, Storyline 360 provides engineering educators who are tasked with teaching in a remote and/or online learning environment, a means to produce high-quality interactive online content for their learners. With a little bit of effort and beyond the challenges experienced, the authors still believe that the benefits of the course far outweigh the costs of adopting this courseware development software as part of your pedagogical toolbelt.

Future Work

With the initial development of the course complete, feedback from the learner is needed to understand the learner's perception of this form of content delivery versus other approaches.

Acknowledgments

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