# LEARNER CONSTRUCTION OF KNOWLEDGE: USING STAGESTRUCK TO DEVELOP A PERFORMANCE

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## *ABSTRACT*

*Learner construction of their understanding is one of the basic tenets of a constructivist framework of learning. Technology-supported learning environments have been developed to support construction and allow students to employ resources to express their ideas and arguments. A new product, StageStruck, has been developed to extend the process of knowledge construction to knowledge domains in which there are multiple solutions and world views of any one task; the construction of multiple meanings that many would argue are highly subjective and open to numerous interpretations.*

*StageStruck introduces the learner to the world of Australian performing arts by exploring a virtual venue (the Sydney Opera House) which in turn provides access to showcases of contemporary companies' performances, processes and people. In addition, this environment for experimentation supports users to produce performances using a range of director's 'tools'. The package brings together several key pedagogical goals: including the designers' emphasis on learning, which occurs through the process of interactive multimedia construction. Less emphasis is placed on the refinement of production skills and more emphasis is placed on student-initiated design and development with just-in-time skill support. When the focus is upon the process, the cognitive load required to use the construction tool(s) has been minimised in order to permit the learner to focus on knowledge construction through experimentation.*

## 1. PROVIDING OPPORTUNITIES FOR PERSONAL INTERPRETATION

Many students have a narrow perception of how a theatrical performance is devised, this is often due to lack of exposure to or opportunity to view or participate in multiple skills required to create a theatrical performance. By extending the boundaries of interactivity in the context of a virtual world, *StageStruck* seeks to provide learners with opportunities to express their own cultural interpretations and understandings. The package introduces the user to the world of Australian performing arts through the exploration of a virtual theatre. The project sought to:

- reveal the diversity and range of the performing arts in Australia;
- inspire learners with excerpts of Australian productions;
- encourage participation in the performing arts;
- discover theatrical creativity through the creation of a scene;
- explore and learn about backstage elements and processes; and
- explore some of the roles and career paths available in the performing arts.

*StageStruck* brings together several key pedagogical goals. While working with the application, learners work within an environment, which mirrors the world of theatre and supports the theatrical outcomes of many interpretations of each scene. Key to the communication of the experience within this application, is the facility to save, share files between learners or re-present an individual constructed performance and interpretation to other students located within the same classroom or across the Internet. This feature offers the potential for users to interact with a distributed community of *StageStruck* directors and designers. The soundscapes, set designs, scripts and scenes produced by this community become an open-ended collection of resources that individuals can tap into and build upon. The internet also provides *StageStruck* users with a virtual audience amongst which subjective ideas, or visual and aural stories, can be tested and discussed with others from culturally diverse environments.

Within the design framework, learners are able to work in an environment that brings together several of the pedagogical goals that Duffy and Cunningham (1996) list as "metaphors we teach by" and suggest as basic assumptions for design.

1. All knowledge is constructed: All learning is a process of construction
2. Many world views can be constructed: hence there will be multiple perspectives
3. Knowledge is context dependent, so learning should occur in contexts to which it is relevant.
4. Learning is mediated by tools and signs
5. Learning is an inherently social-dialogical activity
6. Learners are distributed, multi dimensional participants in a socio-cultural process
7. Knowing how we know is the ultimate human accomplishment

The approach adopted within *StageStruck* is designed to move the user's exploration beyond the simplistic attachment of a line of dialogue or an action to a performer towards experimenting with the more realistic, complex issues associated with directing and delivering a performance. Students are able to immerse themselves in the world of performance. The extensive database of vocal performances, movement animations, and design elements within *StageStruck* provide the user with a rich set of elements enabling them to create performances with a strong feeling of stage depth, a rich sound accompaniment and effective, realistic animated performer movements. The creative key to the activity of directing a performance is to provide a wide range of choices. To this end a variety of video-based animations of recorded movement and multiple audio recordings of each line of dialogue are provided. The user can identify the actor's intention behind making a movement or saying a line and this is used as the basis for selecting the recorded movement or speech. Within the project, students may choose to experiment with performance tools on a virtual stage with the aim of creating a performance or they may choose to explore a backstage world where basic performance concepts have been presented in a tutorial/activity format. The backstage tutorial spaces have been designed to support the skill development for performance creation.

**Figure 1: A portion of the backstage panorama showing door access to 3 of the 5 studios as well as the Green Room**

## 3. STRUCTURES TO SUPPORT A CREATIVE LEARNING ENVIRONMENT

Multimedia learning environments such as *StageStruck* are an attempt to support the ideas of Jonassen and Reeves (1995) when writing to differentiate between instructivist and constructivist approaches to learning.

> ". . . constructivists are more interested in creating learning environments wherein learners use cognitive tools to help themselves construct their own knowledge representations. Cognitive tools and the goals, tasks, culture, resources, and human collaboration integral to their use enable learners to engage in active, mindful, and purposeful interpretation and reflection. In traditional instruction, 'active' refers to stimulus, response, feedback, and reinforcement conditions that help students mirror accepted views of reality whereas in constructivist learning environments, 'active' learners participate and interact with the surrounding environment to create their own interpretations of reality." (Jonassen & Reeves, 1995)

Harel and Papert (1991) have been deeply involved in the investigation of active learning environments where learners are given the opportunity to be more than 'passive recipients of knowledge'.

> ". . . give the learner the active position of the teacher/explainer rather than the passive recipient of knowledge; and in the position of designer/producer rather than consumer of software." (Harel & Papert, 1991, p41)

Schank and Cleary (1995) have described a set of innovative learning architectures based on their conceptualisation of realistic learning situations. They have created powerful example implementations of learning environments where different cognitive learning strategies are built into software and the learner is encouraged to explore their ideas and solutions with differing degrees of support and advice. This structure was included in the *StageStruck* package.

Throughout this project the design team attempted to embody the notion of designing software that supports active learning. Earlier packages from the design team at the University of Wollongong, such as *Investigating Lake Iluka* (1993) and *Exploring the Nardoo* (1996), have provided the user with a visual representation of a meaningful, real world context in the form of a geographical landscape of a lake or river environment. Within this world we embedded information in the form of media reports, measurement data, reference books and articles. Flexible digital tools were provided to support the exploration, collection and reprocessing of information in response to a number of research questions. These worlds were designed around a largely scientific view of data with limited scope for individual, creative expression.

*StageStruck* attempts to extend these boundaries of interactivity in the context of a virtual world by providing learners with opportunities to express their own cultural interpretations and understandings. The world of the performing arts – particularly when given the role of designer and director could be seen as a highly subjective environment open to numerous interpretations. *StageStruck* enables students to gain access to and experiment with numerous set design elements that range from more literal pieces to abstract, construction styles. Mechanisms exist to quickly change the elements and thus produce different worlds into which a performance is set.

## 4. STAGESTRUCK: DESIGN ELEMENTS

The package consists of a number of navigable spaces, accessible either through the Opera House metaphor or the navigation palette (Figure 2)

**Figure 2: Navigation palette as an alternate navigation system.**

The Foyer space is the initial departure point to access the theatre, backstage, the greenrooms, the tutorial rooms and the performance stage. The tutorial rooms and performance stage have been designed to support learners in construction of their performances and in trying out a range of performance ideas. These spaces contain a range of construction tools for performance creation.

The backstage space and green rooms contain a wealth of information about Australian performing arts, showcasing contemporary companies' performances, processes and people. A narrated stage tour space provides a review of the backstage of the theatre, with backstage personnel such as the stage manager, the follow spot and the conductor all outlining their contributions to performance.

A total of nine green rooms are populated with performing arts personalities and company posters. Clicking on the personalities or posters brings into view a detailed showcase, which profiles the person or company. Details about performances, contact details and biographies are available and ready to be grabbed into the user notes. To assist in the investigation of these showcases, a search facility has been provided in the notebook where the instances of specific text entered by the user, is located within showcases. Individual showcases within the resulting list can be clicked to display their contents. Each entry to the Green Room offers a new set of posters and personalities.

The performance stage has two access points – through the foyer or via the backstage area. If learners use the foyer entrance, a pre-designed performance is played where the student is able to view the design potential of the tools at their disposal. By exploring backstage the learner is able to enter the stage space from a rehearsal perspective. Once on stage they are provided with a number of tools that provide the necessary resources and mechanisms of creating a performance. Learners are able to access an extensive set of resources, which include Performance scenes, Set Design elements, Sound Design elements and Performer Actions.

In order to create a performance a score window has been provided for sequencing the interaction of performers, script lines and sound effects. Actions, script lines or sound effects are represented with different line styles with the score.

The duration of each element is adjusted by manipulating the length of its 'line'. Script lines and actions may be associated by snapping them together within a single line space within the score window. The Score provides two minutes of performance. Within this limit the user is free to position actions, script dialogue and sounds in whatever sequence they wish. The ability to overlap and sequence elements in this manner provides a diverse range of options for the user to create within (Figure 3).

**Figure 3: The performance space and score window for constructing performances.**

A series of tutorial spaces have been provided to support learners in construction of their performances. From a technical/design viewpoint, access is available to a Technical Studio to explore the creation of a world using sound; a Wardrobe Studio to work with a costume collection representing different styles and time periods; and a Set Design Studio for combining set elements to create a visual world for a performance. A Writer's Studio enables the student to working with individual lines of dialogue to produce their own performance script. Learners may also visit a Rehearsal Studio to explore the concepts of Intention and Staging. Set designs, soundscapes and scripts can be saved to notes and used within the stage space.

## 5. LEARNER RESPONSES TO STAGESTRUCK

Just how successful this environment is in fostering an understanding of the performing arts in terms of theatrical creativity and developing an appreciation of the backstage elements and processes has been initially investigated through formative evaluation and now, on completion, an extensive summative evaluation program is being implemented.

Early indications resulting from our testing during development have shown that students have been motivated and sufficiently captivated to work with the program for hours on end. Particular memories persist of a computer-game-devoted teenager who said he would be able to generously going to give us half an hour of his time and who was still constructing scenes 3 hours later. Several individual investigations have revealed that even though there is a complexity of the interface, for computer-literate students the learning time to create a final production is reasonable and within acceptable time limits. The interface design assumptions created in earlier products have been maintained in this more open-ended set of problem-tasks. (see Hedberg Harper and Brown, 1994). Key to the products functionality has been the ease of creation using the drag and drop convention. After several more clumsy attempts the interface design group has managed to create complete 'scores' without the reliance on dialogue box interfaces.

When tested with younger children (8 year-olds) some needed guidance as to the drag and drop technique employed throughout the product but once this was grasped they revelled in the creative outputs possible with the package.

> Some had a little difficulty understanding 'drag and drop' in the stage area. Once they discovered this, however, they had fun.
>
> Year 3 boy (with 3 girls) – delighted in creating soundscapes. The group laughed at the silly noises they could create to go with a couple of movements. Didn't bother with a scene." (Primary school teacher/ librarian)

This may be representative of children within the primary school age range using *StageStruck*. It is of no surprise that the pattern of use that these users settle into revolves around activities that provide them with speedy results. The Costume Design Studio and the Set Design Studio both provide a flexible environment which allows the user to work with a variety of graphic elements assembling them into original combinations rapidly.

Students were also able to use the stage at an elementary level, creating 'mini performances' where the scripts provided within the package were ignored. A totally spontaneous approach was employed where collections of actions and sound effects were integrated to produce a humorous event.

The nature of creative humour was evident in all student testing, however, the useability testers did not seem to have understood the same sense of whimsy and were critical of elements such as the hidden sounds which were available if the user clicked on some areas of the screen. While these elements were not critical to the navigation or the main learning outcomes, the professional reviewers were more focussed on the consistency and did not seem to understand that the product had to involve elements of inherent motivation. This raises important questions about the requirements for useability testing for creative and exploratory products. In particular, the measurement of intrinsic interest in a product is not attempted in the same way as the previous distracter testing undertaken in the earlier days of television programs such as Sesame Street.

From the perspective of educators . . .

> I believe *StageStruck* would be a useful teaching tool for Year 9, 10 and 11 Drama. As students travel through the theatrical journey they can construct and deconstruct acting, design and rehearsal techniques. It would also be of some educational value to Year 12 students either as a refinement to their expressive skills or help with initial research set design work
>
> *StageStruck* has possibilities for experimental and experiential Drama teaching and learning strategies and its focus on Australian Theatre is to be commended. (High School teacher)

*StageStruck* will need to be used by students for a longer period of time in order for us to be in a position where more data has been collected towards answering the key questions set out below. Responses to date from educators and students have been encouraging but we wait with interest to see how *StageStruck* may change current and future students' views of the performing arts.

## 6. CONCLUSION

*StageStruck* has provided a vehicle for investigating how learners respond to an environment that enables them to play a decisive role in what they take away from the learning experience. The method in which they interpret the problem of staging and directing a performance and the results they produce have the opportunity to be highly individualised and reflective of their cultural experience and level of maturity.

The ongoing task to improve the experience has generated several interesting questions about the design of this application. For instance:

- What tools need to be provided to facilitate the dexterous use of ideas in textual, visual and dynamic representations?
- Cognitive tools can convert information between representations and scaffold learners in unfamiliar knowledge domains, how should they be designed and operate?
- How can sophisticated representation of context be demonstrated through 3D models of the 'world' with selectable metaphors?
- How can each group of users communicate to other 'worlds' or communities of learners to experience different cultural views and different personal views?

## 7. REFERENCES

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