

StoryStation: an intelligent tutoring system for story writing

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Abstract. StoryStation is an intelligent tutoring system which gives 10–12 year-old children feedback and advice on writing stories. This interactive event will give conference delegates an opportunity to use the StoryStation software to write a story and an opportunity to discuss this writing experience with their peers. .

1. Introduction

StoryStation [1] is an intelligent tutoring system designed to assist children with story writing, based on the prototype system Select-a-Kibitzer [2]. It is aimed at pupils who have reached a basic competency with the mechanics of writing, but require help to improve specific story writing skills. The target age group is 10-12 years old. StoryStation was developed by a design team consisting of eight 10-12 year old pupils, two teachers and a researcher. Pupils and teachers were consulted throughout the design process, and were involved in requirements gathering, critical evaluation, design, animation, and pilot testing activities [3]. The software design was also informed by the aims and objectives of the Scottish National English Language Curriculum guidelines, which Scottish schools are required to teach.

The software gives children feedback on a range of storywriting skills, including spelling, vocabulary usage, and character descriptions. It also provides tools to help with the composition process, such as a dictionary, a thesaurus and banks of words relating to particular topics.

The assessment features are intended to be used during the editing process to draw the pupils' attention to parts of the text where they have successfully used a writing technique. The philosophy behind this is to encourage pupils to take responsibility for their own learning by helping them to identify their own strengths and weaknesses. It is also intended to raise self esteem by praising pupils when they have used language techniques well.

A writing technique which is often encouraged by teachers is making a story more interesting by using descriptive or unfamiliar vocabulary – “using good words” in classroom shorthand. StoryStation uses frequency information from the British National Corpus to identify word in the story which occur relatively infrequently in the English language. This information is used in conjunction with word frequency statistics derived from a corpus of children's stories and the ability level of the user to decide which words should be highlighted as examples of good vocabulary. Use of descriptive phrases is also detected using a part of speech tagger.

Another writing technique which is valued by teachers is describing the characters in a story. Pupils are asked to write descriptions of the characters' appearance and personality, to portray how the characters feel and to write in-character dialogue. StoryStation uses a word spotting approach to identify words which are related to appearance, personality, feelings and dialogue based on an analysis scheme described in [4]. The program compares words in the story to word lists populated with vocabulary associated with the characterisation categories in the analysis scheme. It tailors feedback on these techniques to the user's ability level, and highlights the parts of the story where characterisation techniques have been used.

A very important part of story writing is presenting the plot in a coherent way. A facility for detecting incoherent plots is under development. The approach taken so far is to combine statistical and vector based natural language processing techniques such as latent semantic analysis with knowledge of narrative schemas to detect when a story has deviated from an expected plot structure. This approach will be of use for constrained tasks, such as story re-writing, when the system has structural knowledge of the story which the pupil is attempting to write. This activity is commonly used in classrooms when the teacher wants to separate the creative task of imagining a story plot from the linguistic task of representing the plot in a written form. However, automated detection of incoherence in free-form writing is likely to be a more complex problem and requires more development.

The system's advice is given to pupils on request – it does not provide unsolicited feedback. The user selects the type of help she requires by clicking on one of the buttons. An area of future research is to develop heuristics for deciding when to offer help to pupils, taking into account their ability level, their current progress, the stage in the writing process and possibly their motivational state. In one version of StoryStation, help and feedback is presented via eight different animated pedagogical agents, one for each skill supported by StoryStation.

Consultation with 21 teachers has demonstrated that classroom teachers would find the software useful, particularly to encourage independent learning in their pupils. A field study with 60 pupils at a local state funded primary school was also conducted to evaluate the impact of animated agents on the children's motivation and interactions with the software. Pupils used either a version of StoryStation with animated agents, or an equivalent version with an ordinary interface. Results indicate that the pupils were motivated by StoryStation and thought it was useful [5]. Analysis of questionnaire data indicated that pupils who used the agent version rated StoryStation more highly than those who used the non-agent version. This effect was more pronounced for girls. Analysis of program use revealed that girls were more likely to interact with the agent version, while boys were more likely to interact with the non-agent version [6].

We are about to embark on another development phase of the project as well as conducting longitudinal studies of classroom use of the software. We would particularly appreciate feedback and suggestions from colleagues in the AIED community to guide subsequent project development.

2. Event script

The purpose of the event is to give AIED researchers the opportunity to use the StoryStation system in order to get feedback and suggestions on how to improve the software in the next development stages. Participants will be asked to complete a story writing task which was used in classroom field studies of the software. This task is intended to give researchers an insight into the writing and learning experiences of our target user group. Priorities for our future work include the development of plot-related help, spell

checking tailored for children who are learning to write phonetically, and cognitive scaffolding for pupils with less mature writing strategies. We would therefore greatly appreciate expertise and suggestions from members of the AIED community on these topics. The following activities will take place in the interactive event:

1. *Introduction to the StoryStation project.* The researchers will describe the research goals of the project, and summarise the findings so far.
2. *Story preparation.* The participants will listen to a recording of a storyteller telling a brief story. .
3. *Software demo.* The researchers will briefly explain how to use the software
4. *Story writing using StoryStation.* Participants will have the opportunity to use StoryStation to write their own version of the story which they listened to in the previous step. The researchers will be on hand to help people to use the software (or to write the story!)
5. *Group discussion.* The researchers will lead a discussion session to get feedback from the participants. The following questions will be covered:
 - What did you think of StoryStation?
 - What did you think of the StoryStation agents?
 - What AIED techniques can you suggest for:
 - Providing feedback on story plot;
 - Improving spell check facilities for learner writers;
 - Providing cognitive scaffolding to learner writers to help them adopt more mature writing strategies?

References

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