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科学研究費助成事業　　研究成果報告書

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研究課題名（和文）The effects of learner specific corrective feedback on language ability

研究課題名（英文）The effects of learner specific corrective feedback on language ability

研究代表者
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研究成果の概要（和文）：プロジェクトの過程にわたる研究実験に基づいて、修正された言語データベースが開発されました。 この新しいシステムには、データベースを迅速に拡張して書き込みに関するフィードバックを提供するための単純化されたバックエンド設計が含まれています。 データベースとその基礎となる構造は、国際会議で発表された（Wright&Nakagawa、2019a）。 申請書を現在の語学教師に配布するために、追加の研究が補助金期間外に継続されます。 さらに、小規模な研究では、フライトシミュレータの入力デバイスとしてタブレットコンピュータを使用することが検討されています（Wright&Nakagawa、2019b）。

研究成果の学術的意義や社会的意義
A touch-based database provides language students there with a greater amount of feedback, that can be individually tailored. Language teachers benefit from being able to provide immediate feedback from a handheld device. The database can be quickly modified for use in various academic settings.

研究成果の概要（英文）：A revised language learning database was developed based on prior research experiments over the course of the project. The new system includes a simplified back-end design that will allow the database to be rapidly expanded for use in giving feedback for written language production, alongside the primary goal of tracking oral production. The database was finalized after several consultations with a database training advisor, funded by the current grant. The database and underlying structure were presented at an international conference (Wright & Nakagawa, 2019a). Additional research will continue outside of the grant term to disseminate the application to in-service language teachers. The secondary goal of the project was also advanced during the year. A small-scale study examined the use of tablet computers for use as input devices for a flight simulator, with the data presented to a broad audience from several countries including Taiwan and Thailand (Wright & Nakagawa, 2019b).

研究分野：applied linguistics

キーワード：corrective feedback　language anxiety　self-directed learning　education technology　technology accpetance　language proficiency　Communication　computer simulation

１．研究開始当初の背景

In language teaching settings, paper-based rubrics have been the primary method used for analyzing oral proficiency. This has been the case for in-class evaluations as well as video recorded samples. While the method is widely accepted in practical teaching settings, it is limited by the nature of paper-based data collection, in that it is time consuming to enter data and more so to transcribe the data into a useable form (i.e. input it into a digital format). The limitation has been acknowledged in recent research with attempts to systematize paper-based data into a digital format on a desktop computer and provide feedback within 24-hours (Hunter, 2012). This allowed individual feedback to be provided to language learners. Building on this, Hochgesang (2014) created a tablet-based system to mark sign language proficiency, which allowed for the immediate data entry of performance data. At the start of the current study, in 2015, tablet computers were just becoming mainstream and therefore more readily available for use in education. Concurrently, the principal investigator of this project was developing a touch-based oral proficiency rubric for use in language courses (Wright & Fujimaki, 2014). The result was a working system that provided numeric score visualization using a bar graph. However, the internal design made deployment in large organizations difficult and the visual display lacked the rubric text associated with each numeric score. It was from this starting point that the research project began, with the goal of creating a digital rubric that allows a user to touch the text elements (i.e. from a grid of categories and levels) of the rubric and have the score values (e.g. numeric score) automatically tabulated. There would also be a corresponding color-coded visualization that would highlight the target level for each category. The emergence of touch-based tablet computers also allowed for new ways to interact with computer simulations. The equipment for the main study allowed for a secondary goal of using complex control inputs, using the tablets, to control real-world computers simulations such as flight simulators. This would require critical thinking skills as learners would have to make successive sets of immediate judgements based on simultaneous input from the simulator and an interlocutor.

References

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Hunter, J. (2012). 'Small talk': developing fluency, accuracy, and complexity in speaking. *ELT Journal*. 66 (1), 30-41.

Wright, D., & Fujimaki, A. (2014). Immediate Visual Representations of Tokai Oral Proficiency Scale Ratings – an alternative to Text Based Feedback. *The Report of the Foreign Language Center, Tokai University*, 34, 13-18.

２．研究の目的)

To develop a relational database that runs natively on a tablet computer (e.g. an iPad). The database will track oral proficiency scores over time. The user interface will allow touch input of scores by touching a textbox with a description of oral proficiency level, which will then automatically input a numeric score. The scores will be displayed in real-time and an automated process will color-code performance in each category of language proficiency. A secondary purpose was to validate a procedure to use the iPads as control inputs for a complex flight simulator, allowing peer-to-peer instruction.

３．研究の方法

The database was developed in an iterative process, with each successive build being validated in a research study and the results disseminated to the public at academic conferences and in written publications. Empirical analysis included ANVOA with Bonferroni post-hoc tests. Where possible testing measures included pretest, posttest, and delayed posttest analysis as well as control groups. Research ethics requirements limited data collection to quasi-experimental settings, where university students volunteered to participate in sessions that were not related to coursework, nor did they occur during intact class times. In addition, the user interface was evaluated by a set of professional language instructors, including native English and native Japanese speakers. The feedback was used to refine the user interface and make it more user friendly. There was an additional analysis of learners' level of comfort with being evaluated by an instructor using a digital device. Data was collected using an established survey of foreign language classroom anxiety. Finally, a second survey was used to estimate the perceptions of both instructors and learners in regard to the novel use of an tablet to automate data entry by instructors and to provide immediate, color-coded visualizations of oral proficiency scores to learners, using a survey adapted from human factors research that focused on software development. The measurement of oral proficiency combined with the two surveys provided a large set of data to analyze after each study. The secondary project goal, using iPads as control inputs for a flight simulator, employed similar methods, including statistical analysis of oral proficiency, language anxiety, and comfort with new technology (using a survey adapted from the one developed for the main project goal.)

４．研究成果

Figure 1: Digital Rubric - Oral Proficiency

(1) Over the course of the initial three-year project, a working database was created. It included the ability for a single student (i.e. a record in the database) to be placed in multiple classes, which is critical for deployment in real-world education contexts. The user interface was touch-based, allowing a rater to look at a text and touch it directly to input a corresponding score. The touch input of a specific text item also automatically color-coded the category, showing the current and prior levels as yellow and the next level (i.e. the target level) as green (see Figure 1). Additional functionality included the ability to video-record several learners and associate the video with each leaner individually, so that the samples could be evaluated at a later-time. In terms of display languages, the internal design allowed for two languages to be toggled for viewing. The primary limitation of the internal design was that it included several database and layout elements on the single layout displaying the oral proficiency score for each learner. This made it difficult to modify the layout for other forms of rubrics, such as writing ability and more specifically to alter the numeric score range. While the initial version of the database met the design goals of the project, the project team sought to improve the database so that it could include multiple forms of rubric (e.g. speaking, writing, anxiety level) within a single database. To achieve these goals a request to extend the project term by an additional year was made.

(2) In the final year of the project, the lead researcher received database training from a professional consultant. This allowed the creation a streamlined internal structure for the database (see Figure 2). The number of layout elements was reduced by more than two-thirds and more importantly the ability to add more rubric types in a manageable manner (i.e. reduced complexity). In addition, a new function was added that allowed records with a specific tag (e.g. records with a label such as “diagnostic test”) could be automatically copied to a new location. This allows the records to be exported for use in situations such as grading. By doing so, the full set of data, which might include informal evaluations, quizzes, and formal tests can be easily analyzed to provide a comprehensive record of a learners’ ability in relation to the rubric being used in the database (e.g. oral proficiency).

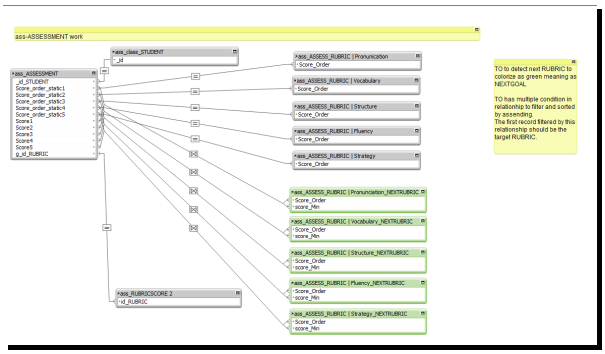

Figure 2: Database Internal Design

(3) Going beyond the research project term, the database is currently being revised to include a writing ability rubric and to re-introduce functionality like video recording. The knowledge the project members gained from the experience will be used to conduct further research related to second language learning and disseminate the results.

(4) The secondary project goal was also achieved within the research term. A full system of six networked computers and up to five networked iPads was created for use in the research. The amount of equipment and space required limited the samples sizes. With that in mind, the statistical analysis of results using ANOVA were not at a significant level regarding changes to oral proficiency. However, an analysis of individual participants found that learners (i.e. from exit interviews and survey data) perceived the treatment sessions, which included operating a flight simulator, to be engaging (i.e. increased the level of motivation) and beneficial to maintaining oral proficiency. As mentioned above, the research project, including the primary and secondary goals, resulted in several publications and presentations, which are listed below.

５．主な発表論文等

〔雑誌論文〕（計3件）

(1) Wright, D. (2018). Building a digitized oral proficiency rubric to enhance Corrective Feedback. *LANGUAGE, CULTURE AND SOCIETY, Foreign Language Teaching and Research Centre, Gakushuin University, 16, 115-126*. (Peer reviewed)

(2) Wright, D. (2017). Simulation-based Language Education: A Theoretical Framework. *The Report of the International Education Center, Tokai University, 37, 63-72*.

(3) Wright, D. (2015). The Effects of Visual and Text-based Feedback on Oral Proficiency Assessment Rubrics. *The Bulletin of the Foreign Language Center, Tokai University, 35, 1-15.* (Peer reviewed)

〔雑誌論文〕（計6件）

(1) Nakagawa, H. & Wright, D. (2016). Language improvement through critical thinking based, dual-coded activities. *THAITESOL Journal, 29 (2), 40-66.* (Peer reviewed)

(2) Nakagawa, H. & Wright, D. (2016). The Impact of Critical Thinking Focused Blog Activities on Writing Skills. *The Bulletin of the Foreign Language Center, Tokai University, 36, 11-25.* (Peer reviewed)

(3) Wright, D., & Fujimaki, A. (2015). Language Anxiety and Visual Corrective Feedback: Japanese Learner Attitudes towards Visual Representations. The Bulletin of the Higher Education Research Institute, *Tokai University, 22, 131-138.* (Peer reviewed)

(4) Nakagawa, H. & Wright, D. (2015a). Integrating Blogs to Enhance Written Communication Skills. The Report of the *Foreign Language Center, Tokai University, 35, 21-38.*

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〔学会発表〕（計10件）

(1) Wright, D. & Nakagawa, H. (2019, March 21st). *Developing a touch-based assessment interface for a language learning database.* Paper presented at The Asia Pacific Conference on Engineering and Natural Sciences (APICENS 2019), Bangkok, Thailand.

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The Asia Pacific Conference on Engineering and Natural Sciences (APICENS 2019), Bangkok, Thailand.

(3) Wright, D. (2018, March 27). *Applying a Digital Rubric to Oral proficiency scale ratings.* Poster presented at Asia-Pacific Association for International Education 2018 (APAIE 2018): The Impact of the Fourth Industrial Revolution on Higher Education in the Asia Pacific, Singapore.

(4) Wright, D. & Nakagawa, H. (2016, September 10). *Vlogs and Foreign Language Writing: Ways to Mitigate Language Anxiety*. Poster presented at Pacific Second Language Research Forum 2016 (PacSLRF2016): Data and theories in second language research, Tokyo, Japan.

(5) Wright, D., Fujimaki, A., & Nakagawa, H. (2016, September 8). *Peer-to-peer Instruction in Computer-simulated Tasks: Processability Theory in Practice*. Poster presented at 16th International Symposium of Processability Approaches to Language Acquisition (PALA), Tokyo, Japan.

(6) Wright, D. & Nakagawa, H. (2016a, August 8). *Technology-enhanced Communicative Activities: flight simulator-based information gap tasks*. Paper presented at The 56th National Conference (LET 2016) The Japan Association for Language Education and Technology, Tokyo, Japan.

(7) Wright, D. & Nakagawa, H. (2016b, August 4). *Language Acquisition Database: user interface needs analysis*. Paper presented at the 2016 International Symposium on Language, Linguistics, Literature and Education, Naha, Japan.

(8) Wright, D. (2016, July). *Simulation-based Language Education (SIMBLE)*. Paper presented at the JACET KANTO 10th Anniversary Convention, Tokyo, Japan.

(9) Wright, D. & Fujimaki, A. (2014, December*). Learning Analytics and Media English: Automating Oral Proficiency Rubric Input*. Paper presented at the 91st, East Japan Regional meeting of Japan Association for Media English Studies, Tokyo, Japan.

(10) Wright, D. (2014, December*)* "Automated visual and text-based corrective feedback", Poster presented at the Learner Development Conference, "Creating Community: Learning Together," December 14, 2014, JALT Learner Autonomy SIG, Tokyo, Japan.

〔図書〕（計0件）

〔産業財産権〕（計0件）

〔その他〕

ホームページ等

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