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Original article

Effects of expertise and multimedia presentation on the enactment and recall of procedural instructions[☆]

Effets de l'expertise et du format de présentation multimédia sur l'exécution et le rappel d'instructions procédurales

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ABSTRACT

It is now well established that text and pictures presentations are superior to text- or picture-only presentations for learning declarative (Mayer, 2014) or procedural information (e.g., van Genuchten et al., 2014), a phenomenon known as the multimedia effect. The multimedia effect appears to be true for novices but not for experts (e.g., Kalyuga et al., 1999). This expertise reversal effect would be due to different information needs between experts and novices. The goal of this study was to examine the effects of expertise and multimedia presentation on the enactment and verbal recall of the procedure's steps in order to determine a presentation that is adapted both to experts and to novices. Sixty participants had to make a bun following an electronic procedure with three different presentations: picture-only, text+picture and text pop-up+picture. The population consisted of novices and experts in hairdressing. After having enacted the instructions with the possibility to refer to the electronic procedure, participants had to recall the steps of

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the procedure verbally. The results revealed that novices' quality of execution was better for presentations combining text and pictures than for the picture-only presentation, in line with a traditional multimedia effect. However, experts' quality of execution was equally good, whatever the presentation. This interaction between expertise and multimedia presentation is compatible with the expertise reversal effect. Surprisingly, when recalling the steps of the procedure, novices outperformed experts. One explanation was that novices paid a lot of attention to the textual instructions conveying the actions to perform, while experts focused on the pictures representing the subgoals to reach. A subsidiary result confirmed this explanation, indicating that novices more frequently open up the pop-up windows containing the textual instructions than experts. Our results do not clearly demonstrate that a combination of pictures and textual instructions displayed in pop-up windows is a presentation that suits both experts and novices but they suggest that when textual instructions that are useless for experts are difficult to ignore, pop-up windows could be a design solution. The contributions of this study are mainly to extend results obtained with expositive materials to procedural instructions and to offer perspectives for procedures design.

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R É S U M É

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L'objectif de cette étude était d'examiner les effets de l'expertise et du format de présentation multimédia sur l'exécution et le rappel d'instructions. Les participants devaient réaliser un chignon à partir d'une procédure informatisée présentée sous 3 formats : images seules, textes+images ou textes escamotables+images. L'échantillon était composé de novices et d'experts en coiffure. Les participants devaient également rappeler la procédure. Les résultats ont indiqué que les novices exécutaient moins bien les instructions lorsque la procédure était présentée sous la forme d'images uniquement que lorsqu'elle combinait instructions textuelles et imagées, alors que la qualité de l'exécution chez les experts n'était pas impactée par le format de présentation. Les novices ont mieux rappelé les étapes de la procédure que les experts. Une explication est que les novices ont accordé beaucoup d'attention aux instructions textuelles communiquant les actions à réaliser, alors que les experts ont focalisé leur attention sur les images représentant les sous-buts à atteindre.

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1. Introduction

Cooking a sophisticated dish or applying for unemployment compensation are examples of tasks that usually require to process instructions. These instructions are often provided by procedural documents. Many research works dealing with this specific type of documents have pointed out their lack of efficiency (Ganier, 2013), as evidenced by handling mistakes, underused devices, and users' weak satisfaction (Cellier, 2005). One explanation deals with the intrinsic difficulty to process procedural instructions. Indeed, processing instructions to enact them requires users to match written instructions, data related to the specific device to manipulate, and the user's prior knowledge

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