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# Cross-cultural evaluation of a web application to support communication and collaboration among stakeholders of the school inclusion of children with ASD

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## Abstract

The schooling of children with autism spectrum disorder is a challenge that relies on all stakeholders (families, schools, and medical-social professionals). In many countries, the Individualized Education Plan (IEP) is a monitoring tool of the schooling process, implemented by the aforementioned stakeholders, but they face several barriers to the co-education process. The CoEd web app was designed using participatory methods in France, with interactive services for the children's follow-up and the three-way collaboration. CoEd applicability was assessed in Belgian cultural context (Walloon territory), as they experiences similar issues. The results showed comparable results between the two countries. The Belgian audience appreciated CoEd and would be ready to use it in real conditions, as is currently the case in France. Thus, this participatory design work developed a tool that meets the needs expressed by the French participants and those of stakeholders beyond French borders.

## Keywords

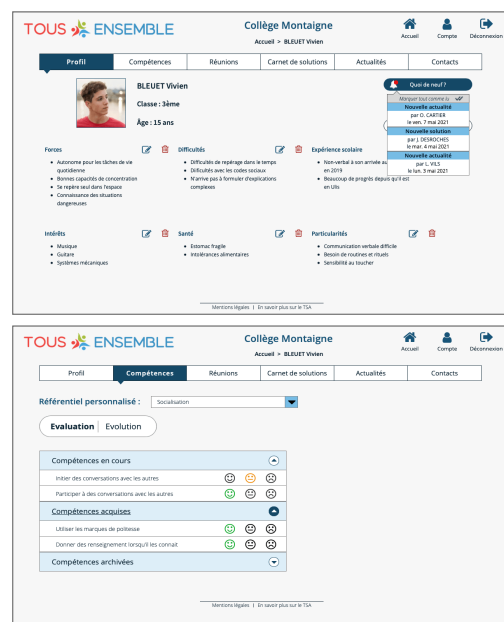
cross-cultural assessment, collaboration, coeducation, inclusive education, participatory design, autism spectrum disorder

## Context

The schooling of children with autism spectrum disorder (ASD) is a challenge that relies on all stakeholders, mainly: families, schools, and professionals in the medical-social sector. Whole-school approaches and the international classification of functioning, disability, and health (ICF) [1] place collaboration and communication among actors as an essential ingredient in the co-education process to foster the success of the school inclusion of children with ASD.

Due the heterogeneity and severity of ASD symptoms, stakeholders have to deal with various educative adaptations, aids and strategies to meet the children's specific needs in their school life [2,3]. In many countries, the Individualized Education Plan (IEP) paper document is a monitoring tool of the schooling process, notably gathering aids and adaptations. The IEP implementation and follow-up is ensured by the IEP team (parents, teachers, out-of-school professionals), but these stakeholders face several barriers to the co-education process [4–6], e.g., information transmission and three-way communication, collaborative monitoring of chil-

dren's evolution, sharing of support practices (aids, adaptations). In this context, digital tools to support school inclusion are seen as promising solutions. However, existing tools focus either on the student or on the relationships between two parties, always including parents, who are responsible for sharing information to ensure good coordination.



**Figure 1:** CoEd interface sample *Left*: profile tab, *right*: skills tab. The CoEd web application (Fig. 1) was designed using participatory methods based on the needs identified in a French

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context [7]. CoEd offers features directed toward the children's follow-up and the three-way collaboration of their caregivers through interactive services. Parents, teachers and out-of-school professionals can access to a child folder whose content can be updated at any time to reflect the evolution of the child and daily practices. Since collaboration and communication issues are partly common with the needs of Belgian stakeholders, we conducted a study to assess the applicability of the CoEd web application and determine the transferability of this tool to another cultural context in the Walloon territory.

## Methodology

Forty-two participants (21 French and 21 Belgian) were recruited among parents, teachers and medical-social professionals. A common evaluation protocol was used to conduct an ergonomic evaluation of the CoEd tool in France and Wallonia. Based on realistic fictitious cases (persona method), we created usage scenarios to test the envisaged features on a high-fidelity interactive mock-up. These scenarios were adapted to the role of the targeted user, namely parents, teachers, and extracurricular stakeholders. We used objective measures and subjective measures to evaluate usability, user experience, mental workload, and self-determination elicited by the tool. To objectively assess the usability of CoEd, screen-recorded sessions were annotated to extract navigation performance measures, that is, time to complete each scenario and average number of active interactions, as well as verbal comments made by the participants. At the end of the session, participants answered to several standardized questionnaires to assess usability (System Usability scale [8]), user experience (User Experience Questionnaire [9]), cognitive load (NASA-TLX, [10]), as well as custom-built questionnaire to assess elicited self-determination (inspired from [11]), perceived difficulty (0-10 scale) and questions related to their perceptions and intention to use the CoEd application.

## Results and Discussion

The analysis of the results shows comparable results between the two countries: usability and user experience were excellent, with low mental workload and a strong sense of self-determination elicited by the application. Few differences were observed between the French and Belgian studies, suggesting that the CoEd web application is transferable to a similar sociocultural context. The Belgian audience appreciated the application prototype and would be ready to use it in real conditions, as it is currently the case in France (ongoing field study). Thus, this participatory design work made it possible to develop a tool that not only meets the needs expressed by the French participants but also meets the needs of an educational community beyond French borders.

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