APPLYING HUMAN-COMPUTER INTERACTION PRINCIPLES TO DESIGN AND EVALUATE AN INTEGRATED SMART GROCERY AND MEAL PLANNING SYSTEM

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Abstract

Many commercial meal-planning and grocery mobile applications separate key features into isolated steps, potentially increasing cognitive context-switching demands for users. This study designed and evaluated a prototype that integrates grocery, meal-planning, budgeting, and recipe activities within a unified, HCI-oriented interaction flow based on contextual task transitions, unified information organization, and cross-domain feedback. Purposive sampling selected 50 participants: professionals (42%), students (36%), and homemakers (22%), aged 31–40 (40%), 18–22 (30%), and 23–30 (30%). During requirements analysis, 71% indicated that they either overlooked planned grocery items (36%) or did so sometimes (35%). When asked to identify the main challenge during meal planning and grocery shopping, 26% selected each of time management, lack of meal planning, and forgetting items, while 14% selected overspending and 8% food waste. The prototype was assessed through a task-based usability test and a post-task questionnaire. Rates for completion of the grocery list generation, meal planning, budget checking and navigating to a recipe in a custom post-task usability questionnaire were 72%, 70%, 60% and 76%, respectively. Across 200 task responses, 50.5% were rated easy, 35.0% medium, and 8.5% hard, while 6.0% were not completed ($M = 1.55$, $SD = 0.66$; $n = 188$ valid responses). Satisfaction, navigation ease, interface clarity and task efficiency were rated at mean scores of 2.24, 2.53, 2.49 and 2.43 on three-point scales, respectively. These findings provide descriptive evidence of task usability and users' perceptions of the proposed HCI-oriented approach. Further studies should compare the prototype with existing applications to examine differences in usability and interaction outcomes.

Keywords: Human-Computer Interaction, Grocery Management System, Meal Planning, Usability Evaluation, User-Centered Design