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UMR 5205 CNRS

Personalized Recommender System for Improving Urban Exploration and Experience Documentation of International Students

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Context & Problem Statement

- **Context:** International students adaptation challenges (culture, urban navigation, language)
  - Impact students' well-being and academic success
- **Key Process:** Reflection on experience
  - critical for adaptation, intercultural competence. *Often hindered.*
- **Gap:** Traditional support insufficient (not continuous/personal)
  - Digital tools often logistical, lack *reflective scaffolding*
- **Need:** Guided, richer documentation & reflection

Research Questions & Contribution

- **Context:** The MOBILES app (Lefevre et al., 2024) – mobile platform for documenting urban experiences
- **Observation**: usage often superficial without guidance.
- ➢ **RQ1:** *How can digital tools be optimized to support insightful documentation by international students?*
- ➢ **RQ2:** *What is the impact of personalized recommendations on student annotation quality?*
- **2 main contributions:**
  - Design & Integration: Context-aware personalized RS in MOBILES
  - Empirical Evaluation: Mixed-methods impact study

The MOBILES Application

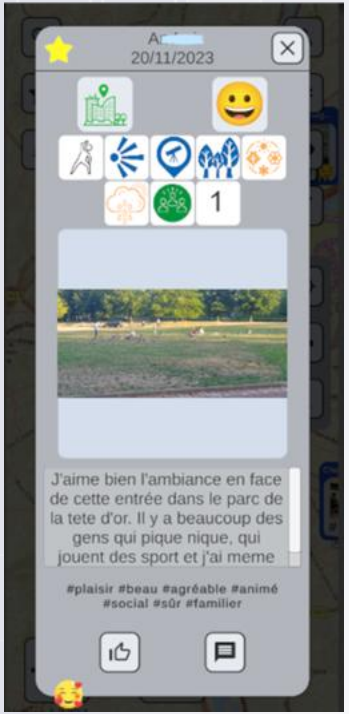
- **Goal**: Capture multifaceted experiences
- **Key Features**

Map Visualization

Experience Documentation

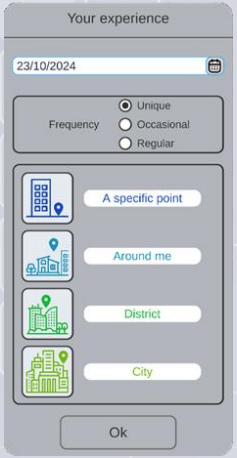
Social Interaction

Tour Planning



The MOBILES Annotation System (briefly)

Annotation: Multimodal records capturing experience facets



Spatial context | Temporal Scope | Free Text | Opt. Photo | Icons | Tags | Emoticons | Share

Context (Where? When? How often?) | **Narrative** | **Structured semantics**

The Missing Piece: Guidance

MOBILES provides the platform, but...

Students may still struggle with:

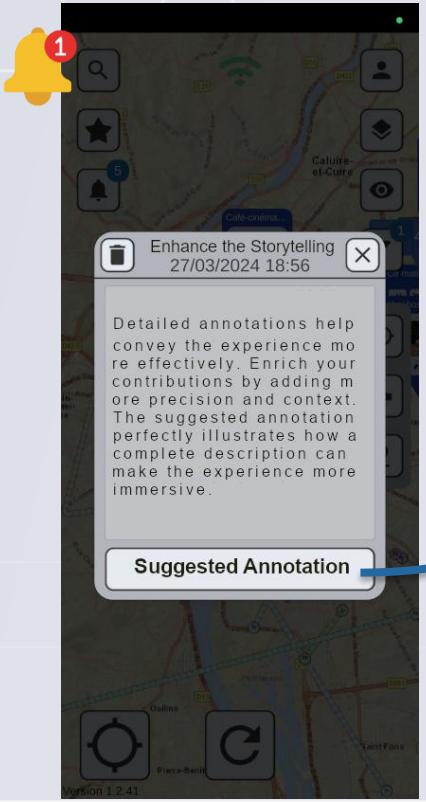
- **What to document:** Feeling unsure where to start
- **Meaningful Reflection:** Going beyond surface-level observations
- **Linguistic Barriers:** Expressing themselves effectively

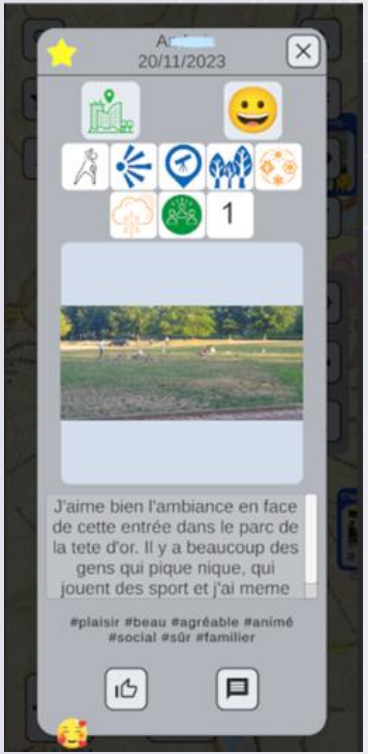
The Personalized Recommender System

- **Goal:** Provide timely personalized, context-aware scaffolding to enhance documentation quality reflection.
- **Data Sources**
  - Interaction logs (user actions, timestamps, geo-data)
  - User profile data
  - Annotations data
- **Recommendation approaches**
  - Collaborative Filtering (patterns of similar users)
  - Content-Based Filtering (matching content attributes to user profile/history)
  - Geographical Context (location-aware suggestions)

The Personalized Recommender System

- **Output:**
  - Personalized Prompts (encouraging action based on metrics)
  - Suggestions (contextual examples, e.g., peer annotations)
- **Delivery: In-app notifications**





Recommendation Strategies

- **Boost Activity (**Metric **: *ActEng*) –** Encourage frequency of documentation
  - Example: “Have you explored any new areas today? Add an annotation!”
- **Enrich Text (**Metric: ***TM*) –** Promote depth & diversity in writing
  - Example: “Detailed annotations help enhance your description. Add more context to make it more immersive.”
- **Foster Affect (**Metric: ***SensR*) –** Encourage expression of feelings & emotions
  - Example: “How did visiting this location make you feel?”
- **Increasing Graphic Usage (**Metric: **GrEx) –** Remind to include photos
  - Example: “Capture this moment with a photo!”
- **Diversifying Icon Use (**Metric: **IcD) –** Encourage using a wider range of icons
  - Example: 'Use an icon to represent the atmosphere of this place.'"

Study Design & Method

- **Approach:** Mixed-Methods Field Study.
- **Participants:**
  - 31 international students, Lyon
  - Diverse (Origin, Study Level, Duration)
  - Median age 24.
- **Duration:** ~5 weeks (March 25 - May 2, 2024)
- **Procedure:**
  1. Onboarding
  2. Usage (MOBILES + RS)
  3. Evaluation (Likert/ Open-ended Questionnaire + Focus Group)
- **Data Analysis:**
  - *Quantitative*: analysis of metric evolution following recommendations
  - *Qualitative*: Thematic analysis of questionnaire (Likert + Open-ended)

Online questionnaire post-study (N=25)

- **Closed-Ended Questions, 5-point Likert scale**
  - Relevance to Personal Interests
  - Variety of Recommendations
  - Facilitation of Discovery (New places/events)
  - Quality/Relevance of Annotation Suggestions
  - Clarity of Recommendation Logic
  - Encouragement to Engage with the App
  - Overall Enhancement of Experience
- **Open-Ended Questions**
  - Specific positive impacts of recommendations
  - Suggestions for improving personalization
  - Overall assessment of influence on app usage and exploration

Results: Impact on Documentation Metrics

Global Trend: Positive

- **Activity (ActEng)**
  - Increase of +7.5%
  - → More engagement
- **Textual Mass (TM)**
  - Increase of +5.9%
  - → Richer text.
- **Graphic Expression (GrEx)**
  - Increase of +55%
  - → More richmedia annotation

- **Icon Diversity (IcD): Positive/ types**
  - Activity +8.9%
  - Sensory +16.5%
  - Social +10.8%
  - Affective +5%
  - Environment +5%
  - → Broader capture.
- **Sensitivity (SensR):**
  - +5% median, but -5.9% mean

Results: Participant Feedback (close-ended)

- **Positive Perception (Median = 4)**
  - Variety of Recommendations (Mean 3.66)
  - Facilitation of Discovery (Mean 3.69)
  - Relevance of Annotation Suggestions (Mean 3.84)
  - Encouragement to Engage (Mean 3.61)
  - Overall Experience Enhancement (Mean 3.73)
- **Moderate Perception (Median < 4)**
  - Relevance to Personal Interests (Median 3.5, Mean 3.50)
    - Suggests personalization could be deeper
  - Clarity of Recommendation Logic (Median 3, Mean 3.38)
    - Key area for improvement

Results: Participant Feedback (open-ended)

- **Appreciated Aspects:**
  - Prompts served as effective reminders & motivation
  - Suggestions provided inspiration for richer annotations (esp. examples)
  - Helped in discovering new places or aspects of the city
- **Critiques & Suggestions:**
  - Strong desire for transparency ("Why this suggestion?")
  - Need for finer-grained personalization beyond current metrics/styles
  - Some found affective prompts "artificial" or "prescriptive"
  - Occasional irrelevance if the system misunderstood context or familiarity

Results: Participant Feedback

"The notifications were not just reminders, but also encouragements that kept me engaged."

"The suggested annotations...introduced me to well-written entries that served as inspiration."

"The prompts felt artificial and pushed me to express myself in ways that don't match how I naturally describe my experiences."

Discussion and Key Takeaways

- **RQ1:** *How can digital tools be optimized to support insightful documentation by international students?*
  - RS scaffolding can help
- **RQ2:** *What is the impact of personalized recommendations on student annotation quality?*
  - Recommendations impacted quality metrics. <u>But:</u> Effectiveness varies (esp. affect). Need adaptive, controllable system.
- **Scaffolding:** Successful push towards more effortful documentation
- **Challenge:** Personalization, More transparency
- **Implication:** RS potential for situated, reflective learning & adaptation Nuanced design needed

Limitations and Future Work

Limitations

- Relatively small sample size.
- Study focused on short-term effects.

Future Work

- Investigate long-term impact on integration and well-being.
- Explore adaptive learning algorithms for improved personalization.
- Expand to include social integration and language acquisition support.

https://mobiles-projet.huma-num.fr/

Thank you!

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