To

Professor Ferenc Hartung

Head of the Doctoral School of Information Sciences

Dear Professor Hartung,

Please find attached the evaluation of the habilitation1 application submitted by Dr. Tibor Guzsvinecz, Associate Professor. The applicant has submitted his request within the field of Engineering Sciences, under the discipline of Information Sciences2, specifically within the subfield of Digital Reality3. His submission includes a thesis booklet entitled "A Multilayer Systems Approach to Modeling User and Player Experience in Interactive Digital Environments", comprising seven theses (T1–T7), organized into three thematic groups.

Assessment of the Candidate's Academic Profile

Dr. Guzsvinecz obtained his PhD degree in 2021 at the University of Pannonia, focusing on the effects of virtual and augmented reality on human–computer interaction. According to MTMT, his scholarly output consists of 146 publications (56 journal articles, 69 conference papers, and 4 edited volumes), accompanied by 879 independent citations and an independent h-index of 16[4].

The ITDI data sheet indicates that the applicant not only meets but substantially exceeds the formal requirements: his total score is 165, compared to the required minimum of 120 points; his MTA-equivalent I value is 553, and his Q value is 50.409. The ranking of the journals is likewise compelling: among the five publications identified as most significant, one appears in a D1 journal (Computers in Human Behavior, IF: 9) and one in a Q1 journal (Virtual Reality, IF: 5), both multi-authored. Notably, three single-authored publications are also included: one Q1 (Multimedia Tools and Applications, IF: 3) and two Q2 (Universal Access in the Information Society, IF: 2.7; Entertainment Computing, IF: 2.4). He also contributed

[1] Habilitation was translated directly from the hun. Habilitáció.
[2] Engineering Sciences, under the discipline of Information Sciences was translated from the hun. Műszaki tudományok tudományterületen, Informatikai tudományok tudományágon belül.
[3] Digital Realities was translated from the hun. Digitális Valóság.
[4] According to his site on Google Scholar today: https://scholar.google.com/citations?user=03Sg_PgAAAAJ&hl=no&oi=ao

significantly to editorial work, guest editing, suggesting special issues at journals, and conference organization. He is also a member of IEEE and the public body of the Hungarian Academy of Sciences.

In terms of teaching activity, over the ten years preceding the application, he has delivered 2,212 contact hours (more than 1,000 of which were lectures), supervised 58 theses and student research projects and he is involved in PhD education.

Although he does not yet have a doctoral student who has completed a degree under his supervision, he meets the minimum requirement for researcher training through three ongoing co-supervisions. This satisfies the regulations for this stage. His supervisory trajectory is still at an early stage, something the candidate is undoubtedly aware of, and which will naturally mature in the coming years.

To sum up the quantitative and mandatory indicators, according to these the candidate fully satisfies the general and quantitative requirements for habitation, and in several respects exceeds them.

Evaluation of the appended Theses

First thesis group (perceptual–cognitive layer, T1–T2)

The distance estimation (T1) and sound localization (T2) experiments are carefully designed, controlled studies implemented in Unity, supported by appropriate statistical analyses (logistic and linear regression, interaction models, χ^2 tests, effect sizes, and confidence intervals).

While immersion is operationalized as a binary device contrast between a desktop display and the Gear VR. As the Gear VR is now obsolete, a 3DoF mobile HMD, the extent to which the conclusions generalize to contemporary 6DoF headsets warrants future consideration.

Second thesis group (participation conditions and accessibility, T3–T4)

The cybersickness thesis (T3) is methodologically one of the most innovative components of the booklet: filtering more than one million Steam reviews using BERTopic to examine an out-of-lab phenomenon represents genuine novelty, confirmed by its publication in the Q1 journal Virtual Reality. However, the effect size in T3 is weak; with such a large sample, statistical significance is nearly guaranteed.

The accessibility thesis (T4) is based on manual coding of 260 games. It is a careful work, but fundamentally, exploratory, and descriptive.

Third thesis group (structural–affective layer, T5–T7)

This group constitutes the core and strongest contribution of this application. The conceptualization of high-level genre as an affective macro-architecture (T5), based on more than 30 million reviews and published in a D1 journal, is a substantial achievement. The analyses of player interaction modes (T6) and design paradigms (T7) further elaborate this framework at meso- and micro-levels.

T7 synthesizes ten of the candidate's previous publications from the same Steam-based research program. While such a synthesis can legitimately serve as an independent thesis, it would be advisable during the defense to articulate explicitly what new structural insight emerges from the synthesis that was not presented in the individual papers.

On Scientific Novelty

I wish to emphasize T3 and T5 in particular. While new VR headsets appear, the use of them result in cybersickness for many, the lesson from this work affects many. T3 examines cybersickness as an out-of-lab phenomenon based on more than one million commercial VR reviews. This is a novel approach, affecting many and important both in subject matter and methodology, as confirmed by its Q1 publication in Virtual Reality. T5 conceptualizes high-level genre as an affective macro-architecture using more than 30 million reviews; this is the highest-ranked result in the booklet, published in the D1 journal Computers in Human Behavior and regards to how players experiencing games.

The remaining theses complement these two pillars: T1–T2 provide solid experimental foundations, while T4, T6, and T7 elaborate the participatory and structural–affective layers of the model.

The ranking of the publications underlying the seven theses convincingly demonstrates the scientific weight of the results.

General Remarks on the Overall Composition Model

The most ambitious part being the most significant strength, and simultaneously the most vulnerable aspect, of the application is the unified operator-composition model (Equation 26). It represents an ambitious, characteristic, informatics-oriented attempt to integrate three traditionally separate domains (perception, participation constraints, affective discourse) into a single formal framework. This provides the structural backbone of the thesis booklet and

distinguishes it from a mere collection of papers. At present, however, the formalism functions more as a systematizing notation than as an estimated or empirically validated model. The individual operators were examined on separate datasets using different methodologies (T1 and T2: 229 and 110 laboratory participants; T4: 260 games; T3, T5–T7: million-scale corpora). Consequently, the connections between layers are more theoretical than empirical. This is not a flaw, but rather a natural boundary of the current research stage, and it points toward a promising direction for future development.

Questions for the Candidate

- To what extent can the results be used examining modern 6DoF HMDs, and which results depend critically on the specific characteristics of the Gear VR platform?
- In million-scale datasets, statistical significance is nearly automatic. What threshold does the candidate consider to represent practically meaningful effect sizes, and which conclusions in T5–T7 would remain robust under such stricter criteria?
- T7 is presented as a synthesis of ten prior publications. What new structural insight emerges specifically from the synthesis that was not present in the individual papers? How does the synthesis advance the conceptual framework beyond the sum of its parts?
- The core contributions in T5–T7 rely on computationally intensive text analysis of player discourse. How does this methodological approach align with the narrower field of Digital Reality, as opposed to adjacent domains such as social science (about computations) or game studies?
- Are the models, preprocessing steps, and codebases accessible for independent replication?
- Since the operator-composition model (Equation 26) currently functions primarily as a systematizing formalism rather than a validated empirical model, what are the candidate's plans for developing this framework into an empirically estimated and cross-layer validated model in future research?

Summary

Based on the presented scientific results, publication record, and teaching and academic organizational activities, Dr. Tibor Guzsvinecz is fully suitable for the title of habilitated doctor. His results constitute internationally validated, independent scientific contributions.

I support the advancement of the procedure to the public phase. Following a successful public defense, I recommend awarding the title of habilitated doctor.



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