



# Michigan Tech

**CS5760 – HCI Usability Testing**

## **Topic Paper – Ensuring Security in Human Computer Interface**

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# Topic Overview & Background

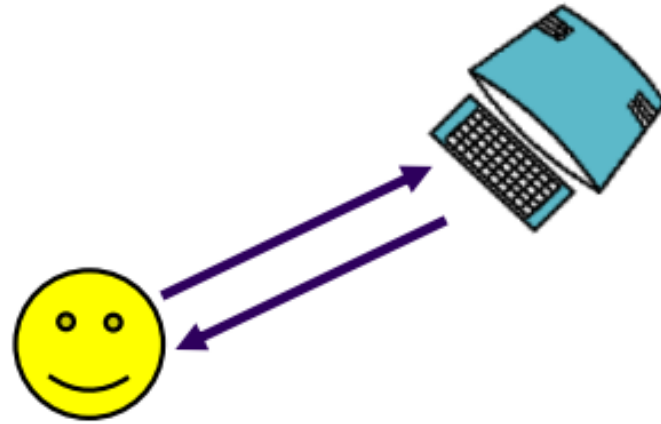
- **HCI deals with loads of information**
- **Information security needs to be ensured**
- **Analysis with existing security measures**
- **Recommendation for robust technique**
- **Find the challenges to overcome**



# What is HCI and Security

**Human Computer Interaction has Three Components**

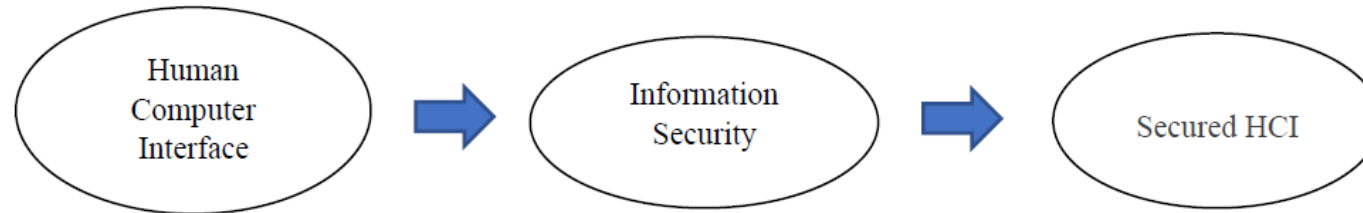
- ▶ Human
- ▶ Computer
- ▶ Interaction



**Goal is to ensure a secured environment between user and computers  
by a secured interaction.**



# Existing Methods for Information Security



- Encryption Program or A Firewall
- Antivirus Software, Even a Login page of Internet Banking
- Smart Home Door Lock System



# Criteria For a Robust HCI

- Visibility of System
- User Control and Freedom
- Sync Between System and Real World
- Consistency and Standards
- Flexibility and Efficiency of Use
- Aesthetic and Minimalist Design
- Help and Documentation

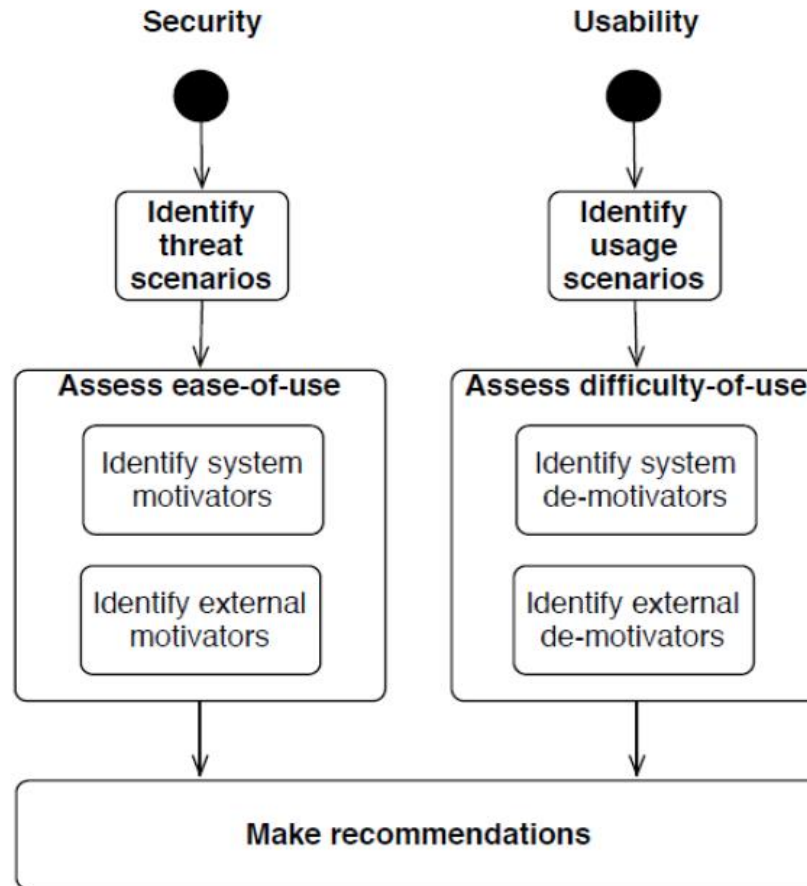


# Security and Usability Analysis

- Identify Usage Scenario
- Identify Threat Scenario
- Make Recommendations



# Security and Usability Analysis Process





# Challenges

- Creation of an acceptable threat model before designing a standard threat model.
- Lack of synchronization between system expectations and security threats.
- Designing a robust user environment from user activities.
- Lack of user knowledge towards security.



# Thank You



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# References

- [1] Nielsen, Jakob, and Rolf Molich. "Heuristic evaluation of user interfaces." In *Proceedings of the SIGCHI conference on Human factors in computing systems*, pp. 249-256. 1990.
- [2] Michels, Sjoerd. "Co-writing, look and feel." *Master's thesis, Tilburg University* (1995).
- [3] Hewett, Thomas T., Ronald Baecker, Stuart Card, Tom Carey, Jean Gasen, Marilyn Mantei, Gary Perlman, Gary Strong, and William Verplank. *ACM SIGCHI curricula for human-computer interaction*. ACM, 1992.
- [4] Botha, Reinhardt A., and Tshepo G. Gaadingwe. "Reflecting on 20 SEC conferences." *Computers & Security* 25, no. 4 (2006): 247-256.
- [5] Patrick, Andrew S., A. Chris Long, and Scott Flinn. "HCI and security systems." In *CHI'03 Extended Abstracts on Human Factors in Computing Systems*, pp. 1056-1057. 2003.
- [6] Rosson, Mary Beth, John M. Carroll, Con Rodi, Ian Alexander, and Neil Maiden. "Teaching computer scientists to make use." *Putting scenarios into practice: The state of the art in scenarios and use cases* (2004): 445-463.
- [7] Kazman, Rick, Gregory Abowd, Len Bass, and Paul Clements. "Scenario-based analysis of software architecture." *IEEE software* 13, no. 6 (1996): 47-55.
- [8] Kainda, Ronald, Ivan Flechais, and A. W. Roscoe. "Security and usability: Analysis and evaluation." In *2010 international conference on availability, reliability and security*, pp. 275-282. IEEE, 2010.

