A n optimal human computer interface is essential for suc-
cessful implementation and maximum benefit of the electronic
health record (EHR). Human factors is the “scientific discipline con-
cerned with the understanding of interactions among humans and other
elements within a system” (Human Factors and Ergonomics Society,
2014). Human factors research can promote understanding of the nurse
and EHR interaction. One aspect of human factors is usability; the ease
of use or the quality of a user’s experience with a product or a system.
Usability includes design, interaction, and evaluation of human use of
technology in particular contexts, such as the EHR. The goals are:
• Effectiveness: accuracy, can complete expected tasks, prevent use
  errors, promote safety
• Efficiency: productivity, time to complete tasks, time and ease of
  learning and maintaining skill, costs of training and modifications
• Satisfaction: agreeable to users, user perception of effectiveness
  and efficiency
Without good EHR usability, nurses will develop workarounds and
encounter unintended consequences.

Heuristic evaluation is a type of study used to identify usability prob-
lems. The heuristic evaluation method is experience-based problem solv-
ing, in a somewhat trial-and-error fashion. Representative users (nurs-
es) called evaluators are recruited to perform representative tasks (rele-
vant work or device such as EHR documentation). The experimenter (observer)
watches what the evaluators do with the task, where they
succeed or experience difficulty, and listen to the evaluator talk while per-
forming. Usability testing is done indi-
nividually, one evaluator at a time,
lasts about an hour, with about
five evaluators. Testing usually be-
gins early in the design process, with
design revisions after each evaluator
(because different evaluators find
different problems), and results in a
final design. Sometimes usability
evaluation is done with a live prod-
uct in use.

Evaluation is guided by usability
heuristic principles, an established
set of common properties of human–
system interfaces such as: consisten-
cy in screen layouts, terminology
consistent with real world, minimal-
ist without unnecessary clicks, and
prevents users from making errors
(Harrington, Porch, Acosta, & Wilkens,
2011; Nielson, 1995a).

Evaluation summarizes the usability
problems, or violations of heuristic
principles. Each problem is then
assigned a severity rating of 0 to 4 by
the evaluators (Nielson, 1995b): 0:
No usability problem
1. Cosmetic problem that does not
need fixing unless time is available
2. Minor problem and fixing is a
low priority
3. Major problem and fixing is a
high priority
4. A usability catastrophe that needs
fixing before continuing

Nurses in one hospital conducted a
live environment heuristic evaluation
usability study of their EHR interface
after implementation, because of
user dissatisfaction (Harrington et al.,
2011). Nurse evaluators considered
documentation tasks and identified the
problem locations, descriptions, and
principles violated, assigned severity
ratings, and suggested solutions. The
researchers identified a (not uncom-
mon) heuristic violation of duplicate
and inconsistent documentation. Skin
color was documented in two locations,
with different formats, and different
adjectives for skin color. Documenta-
tion duplications and inconsistencies
result in poor usability that can im-
 pact effectiveness (interfere with accu-
rate data extraction for monitoring
and reporting, promote assessment
errors), efficiency (slow the process of
learning and completing documenta-
tion), and satisfaction (frustration
with inconsistencies and redundancy).
Although evaluations are gener-
ally done before implementation, a
usability study of an implemented
EHR can optimize benefits. Nurses
are the major users of hospital
EHRs and need to participate in
usability evaluation.

Patricia Robin McCartney is the
Director of Nursing Research at MedStar
Washington Hospital Center,
Washington, DC, Professor Emerita,
State University of New York Univer-
sity at Buffalo, and an Editorial Board
Member of MCN. Dr. McCartney
can be reached via email at patricia.
mccartney@gmail.com

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References
Harrington, L., Porch, L., Acosta, K., & Wilkens,
record benefits: An easy-to-do usability
study. Journal of Nursing Administration,
41(7B), 331-335. doi:10.1097/NNA.0b013e
3182250b23

Human Factors and Ergonomics Society.
from www.hfes.org

nngroup.com/articles/ten-usability-heuristics/
Nielson, J. (1995b). Severity ratings for us-
nngroup.com/articles/how-to-rate-the-
severity-of-usability-problems/