Supplementary material

Supplementary Table 1. Gantt chart for CPReCoder study.

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| Activity | Time |
| Mar–Aug 2020 | Sep 2020–Feb 2021 | Mar–Jun 2021 | Jul 2021–Aug 2021 | Aug–Oct 2021 | Sep–Oct 2021 | Nov–Dec 2021 | Jan–Jun 2022 |
| Application Development (Phase I) | Development Planning | Observations and Problem Identification | Wireframe Design and Initial Testing | Feedback Integration and Finalization |  |  |  |  |
| Simulation Study (Phase II) |  |  | Study Design and IRB approval | Study Setup | Simulation Execution |  |  |  |
| Data Collection |  |  |  |  | Data Collection |  |  |  |
| User Experience Assessment (Phase III) |  |  |  |  | SUS Scoring | Interviews |  |  |
| Data Analysis |  |  |  |  |  |  | Initial Analysis |  |
| Final Analysis & Manuscript Preparation |  |  |  |  |  |  |  | Analysis and Writing |

IRB, institutional review board; SUS, system usability scale.

Development Planning: Initial meetings, setting application objectives; Observations and Problem Identification: Gathering insights from medical personnel and identifying issues with current CPR recording methods; Wireframe Design and Initial Testing: Creating the application's initial design and conducting preliminary tests; Feedback Integration and Finalization: refining the application based on feedback and finalizing the design; Study Design and IRB Approval: Planning the simulation study and waiting for IRB approval; Study Setup: Preparing the simulation environment; Simulation Execution: Conducting the simulation study, Data Collection: Gathering data from the simulation study; SUS Scoring: Conducting System Usability Scale assessments; Interviews: Conducting semi-structured interviews; Initial Analysis: Preliminary analysis of the collected data; Analysis and Writing: Final data analysis and manuscript preparation.

Supplementary Table 2. System usability scale questionnaire.

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| For each of the following statements, please mark one box that best describes your reactions to the APP today. |
|  |  | SD | D | N | A | SA |
| 1 | I think that I would like to use the APP frequently. | 1 | 2 | 3 | 4 | 5 |
| 2 | I found the APP unnecessarily complex. | 1 | 2 | 3 | 4 | 5 |
| 3 | I thought the APP was easy to use. | 1 | 2 | 3 | 4 | 5 |
| 4 | I think that I would need the support of a technical person to be able to use the APP. | 1 | 2 | 3 | 4 | 5 |
| 5 | I found the various functions in the APP were well integrated. | 1 | 2 | 3 | 4 | 5 |
| 6 | I thought there was too much inconsistency in the APP. | 1 | 2 | 3 | 4 | 5 |
| 7 | I would imagine that most people would learn to use the APP very quickly | 1 | 2 | 3 | 4 | 5 |
| 8 | I found the APP very cumbersome (awkward) to use. | 1 | 2 | 3 | 4 | 5 |
| 9 | I felt very confident using the APP. | 1 | 2 | 3 | 4 | 5 |
| 10 | I needed to learn a lot of things before I could get going with the APP. | 1 | 2 | 3 | 4 | 5 |

SD, strongly disagree; D, disagree; N, neutral; A, agree; SA, strongly agree.

Supplementary Table 3. Examples of interview questions.

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| Engagement and intention to use |
| • What are your general opinions about the application? |
| • What impressed you about the application? |
| • Would you be willing to use this application in the clinical field? |
| • What are your opinions on the possibility of implementing this application in clinical practice? |
| Information processing & quality |
| • Does the application include enough details for CPR records? What would you like to include or eliminate? |
| • What were the pros and cons of the application-based recording method compared to the handwritten or web-based methods that had been used before? |
| Functionality |
| • What do you think of the application’s user interface? |
| • What inconveniences did you experience when you used the application? |
| • Did you experience any challenges when using the application? |
| Suggestion for improvement |
| • Which component of the application would you like to improve? |
| • What are the risks associated with using this application in clinical settings? |

CPR, cardiopulmonary resuscitation.

Supplementary Table 4. Baseline characteristics of the participants.

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| --- | --- |
|  | Study participants(N = 16) |
| Age (yr) | 32 (27.5–39.5) |
| Sex, female | 14 (87.5%) |
| Occupation |
|  | Emergency medicine physician | 4 (25%) |
| Emergency room nurse | 9 (56.3%) |
| Emergency medical technician | 3 (18.8%) |
| Clinical experience (yr) | 7.5 (3.5–12.5) |
| BLS provider\* | 12 (75%) |
| ACLS provider\* | 12 (75%) |
| Institutional CPR training | 16 (100%) |

\*Certified by the American Heart Association. BLS, basic life support; ACLS, advanced cardiac life support; CPR, cardiopulmonary resuscitation. Data are presented as median with interquartile ranges or frequency (%).

Supplementary Table 5. System usability scale of each participant.

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| --- | --- | --- |
| Participant | Question | SUS score |
| q1 | q2 | q3 | q4 | q5 | q6 | q7 | q8 | q9 | q10 |
| p1 | 5 | 2 | 5 | 1 | 3 | 1 | 5 | 2 | 4 | 1 | 87.5 |
| p2 | 5 | 1 | 4 | 2 | 5 | 1 | 5 | 1 | 4 | 1 | 92.5 |
| p3 | 5 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 5 | 2 | 80.0 |
| p4 | 5 | 1 | 5 | 2 | 4 | 1 | 5 | 1 | 5 | 1 | 95.0 |
| p5 | 5 | 2 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 97.5 |
| p6 | 5 | 2 | 5 | 2 | 4 | 2 | 5 | 1 | 5 | 3 | 85.0 |
| p7 | 5 | 2 | 5 | 1 | 5 | 2 | 5 | 2 | 5 | 1 | 92.5 |
| p8 | 5 | 4 | 5 | 1 | 5 | 2 | 5 | 1 | 5 | 2 | 87.5 |
| p9 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 1 | 3 | 2 | 75.0 |
| p10 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 100.0 |
| p11 | 4 | 2 | 5 | 2 | 4 | 1 | 4 | 2 | 5 | 1 | 85.0 |
| p12 | 4 | 2 | 4 | 2 | 4 | 1 | 4 | 2 | 4 | 2 | 77.5 |
|  |  |  |  |  |  |  |  |  |  |  | 87.9\* |

SUS, system usability scale. \* Mean of SUS scores.



Supplementary Fig. 1. Example screenshot of the final report from CPReCoder. (A) an image file modeled after the hospital’s CPR documentation form, and (B) a text file that records all entered information chronologically. English explanations are added to the Korean text to facilitate comprehension for the readers. BVM, bag-valve-mask ventilation; CPR, cardiopulmonary resuscitation; ECG, electrocardiogram; VF, ventricular fibrillation; ROSC, return of spontaneous circulation.

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Supplementary Fig. 2. Diagram of the dashboard system for cardiopulmonary resuscitation. The application transfers data to the dashboard in real-time, and includes interventions, administered medications, and relevant patient information, allowing the CPR team to review the current situation on-site. The dashboard system does more than just display information entered into the application; it also includes features intended to reduce the cognitive load on the CPR team. In addition, it also displays real-time CPR quality metrics like the chest compression fraction. CPR, Cardiopulmonary resuscitation.