

SimNow 2.0 as a Training and Assessment Tool for Robotic Surgical Skills: A Pilot Validation Study

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Introduction

This study evaluates the **clinical relevance** and **content validity** of **SimNow™ 2.0** as a training and assessment tool for robotic surgical skills.

- SimNow™ 2.0 is a VR-based training platform for da Vinci surgical systems with **38 progressive exercises**.
- Exercises incorporate **quantitative performance metrics** to support objective feedback and assessment.
- The pilot study examines **user perception** and **training value** across different experience levels.

Methods

A pilot study was conducted to evaluate the training value and content validity of selected **SimNow™ 2.0 simulation modules**.

Subjects: 36 surgeons participated in the study: 17 naïve, 12 novice, 7 expert.

Study Protocol:

Participants completed three warm-up tasks followed by 3 trials of 4 simulation modules (see Figure 1):

- Cold Cut Dissection, Four-Arm Relocation, Active Retraction and Needle Targeting exercises.

Performance metrics were automatically recorded during each exercise.

Survey Evaluation:

- Participants completed a post-session survey using a 5-point Likert scale (5 = strongly agree, 1 = strongly disagree) to assess clinical relevance, training value, and skill applicability.
- Kruskal-Wallis ANOVA and Content Validity Index (CVI) were used for statistical analysis.

Preliminary Results

Participants reported (see Figure 2.) **strong agreement regarding the clinical relevance and training value of SimNow™ 2.0**

- High agreement on clinical relevance of SimNow™ 2.0 (mean = **4.5 ± 0.8**).
- Exercises rated effective for improving surgical efficiency (**4.3 ± 0.7**) and skill retention (**4.3 ± 0.8**).
- Participants reported increased confidence in robotic skills (**4.4 ± 0.8**).
- No significant differences was found between experience groups (ANOVA).
- Scale-level Content Validity Index (CVI) and Item-level CVI: 1.0 (**perfect agreement**) and 0.825 (high inter-rater agreement) respectively.

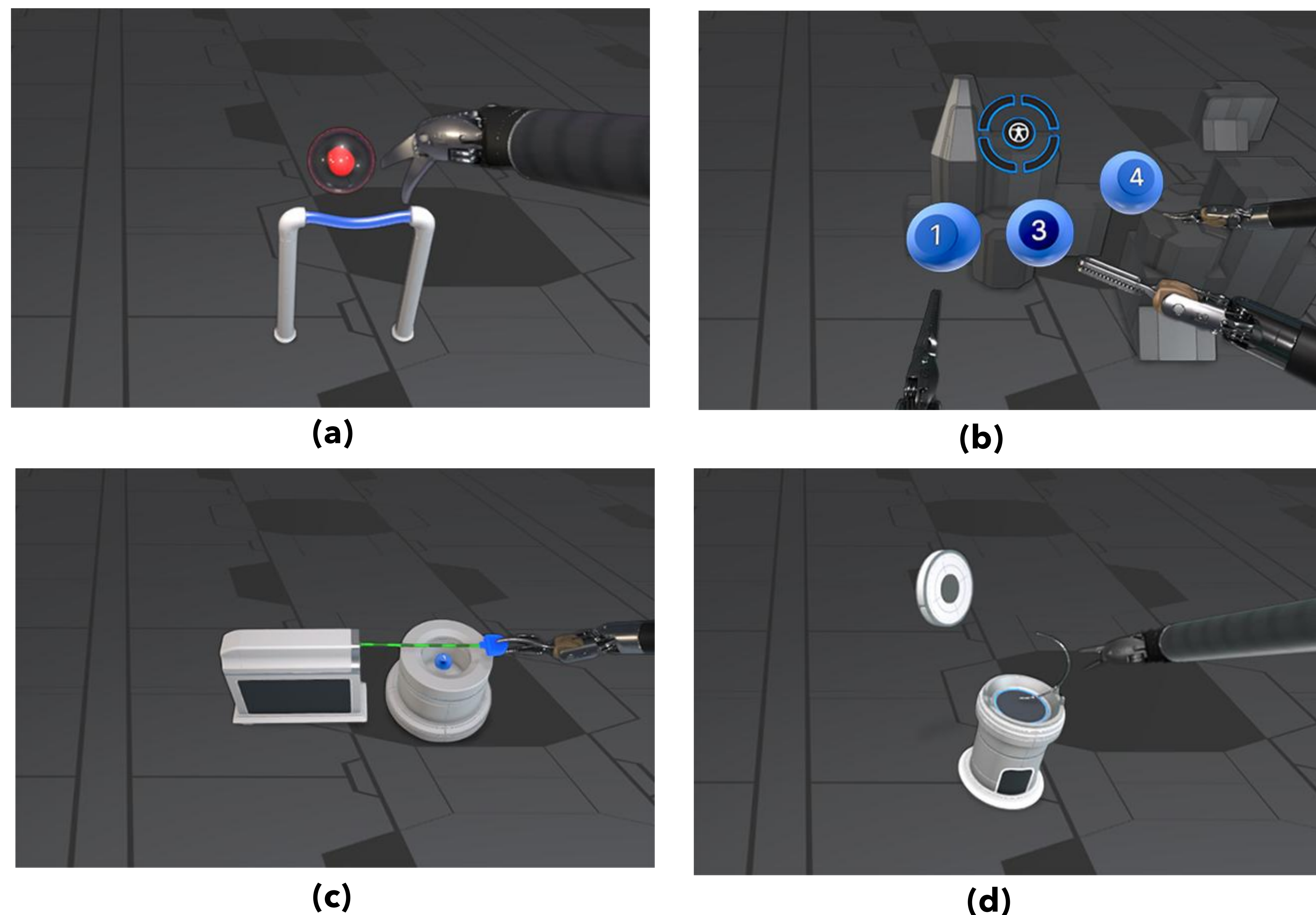


Figure 1: SimNow™ 2.0 exercises used for the pilot subject study (a) Cold Cut Dissection (b) Four-Arm Control (c) Active Retraction (d) Needle Targeting exercises.

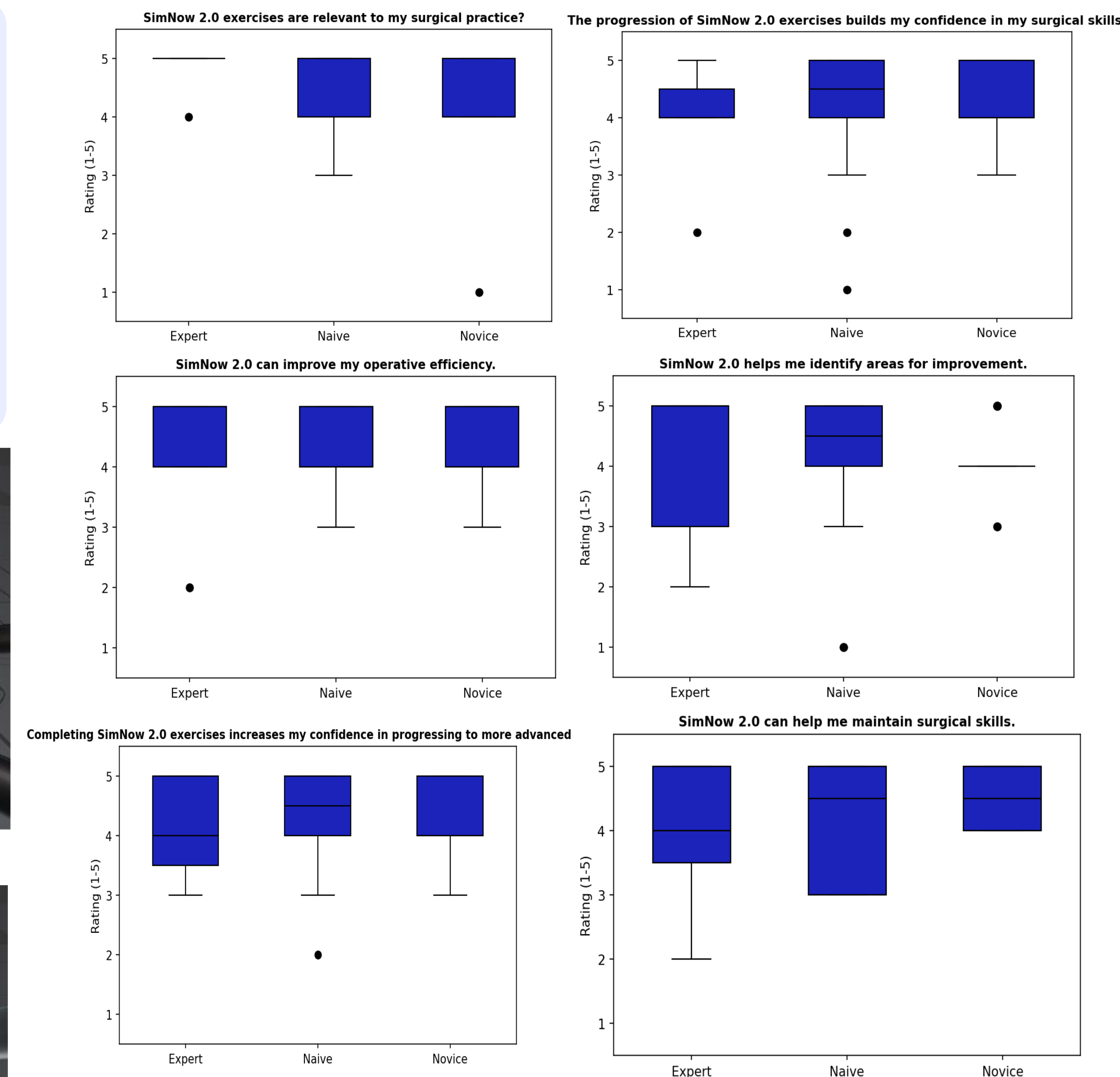


Figure 2. Qualitative survey findings for the cohort.

Conclusion

SimNow™ 2.0 demonstrates strong clinical relevance and content validity as a robotic surgery training platform. The system provides:

- Structured skill development objective performance metrics
- Consistent training value across experience levels
- Potential to serve as an effective training and assessment tool for robotic surgery technical skill acquisition.