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Student Number: 2117164

INTEGRATING TECHNOLOGY AND TRADITION

A Mixed-Methods Evaluation of 'Sing & See' Software for Pitch Accuracy in Gospel Melisma Pedagogy

Presented by Lyanna Austin

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Student Number: 2117164

INTRODUCTION

Purpose

- Explores the potential of integrating Real-Time Visual Feedback (RVF) technology, specifically Sing and See software, into gospel pedagogy to improve pitch accuracy in gospel melisma.
- To bridge the gap between traditional gospel pedagogy and current technological advancements in vocal education.

Background

- 15+ years as a professional gospel singer and CCM vocal coach
- Observed limitations in the traditional teaching of melisma

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JUSTIFICATION

Gap in Existing Research

- Limited use of Real-Time Visual Feedback (RVF) technology in gospel music education, despite its common application in Contemporary Commercial Music (CCM).
- Lack of objective, structured feedback for teaching gospel melismas, which are traditionally passed down through oral methods.

Addressing Pedagogical Limitations

Traditional methods for teaching gospel melismas rely heavily on call-and-response and lack precise feedback. RVF technology offers the potential for immediate, objective analysis, filling a critical gap for gospel singers (Robinson-Martin, 2010).

Cultural Sensitivity

Balancing technological innovation with the preservation of gospel music's emotional, spiritual, and improvisational qualities.

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KEY QUESTIONS

- What effect does Real-Time Visual Feedback (RVF) technology, such as 'Sing & See', have on improving pitch accuracy in gospel melisma for singers of different backgrounds and experience levels? (Callaghan et al., 2004; Hoppe et al., 2006)

- How can modern technology be integrated into gospel vocal training while preserving its cultural and spiritual traditions? (Howard et al., 2004; Welch et al., 2005)

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HYPOTHESIS

* 1. The integration of RVF technology in gospel vocal training will improve pitch accuracy in gospel melismas compared to traditional training methods.

* 2. Participants will show a positive attitude towards using RVF technology, with high perceived usefulness and ease of use scores

METHODOLOGY

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Research Design

Mixed-methods approach: Convergent parallel design (Creswell & Plano Clark, 2017)

Within Subject Design

Participants act as their own control (Charness et al., 2012)

Participants

Sample: 28 gospel singers (15 amateur, 13 professional)





METHODOLOGY

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Data Collection: Quantitative

- Pitch Accuracy - data was collected through pre-test and post-test performances of gospel melismas, analysed using Praat software to assess pitch deviation
- Surveys based on Technology Acceptance Model (TAM) (Venkatesh & Davis, 2000) & Cognitive Load Theory (CLT) (Sweller, 2010)



Analysis

Pitch Measurement
- Descriptive Statistic
- Paired Sample T Test
- Effect Size

Survey
- Descriptive Statistics
- Pearson Correlation

METHODOLOGY

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Data Collection: Qualitative

- Semi-structured interviews
- Focus groups
- Researcher's reflective journal

Analysis

- Coding - Invivo, Axial and Word Frequency (Saldaña, 2021)
- Thematic Analysis - inductive and deductive (Özdemir, 2023).



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LITERATURE REVIEW

Previous Research

- Focus: Gospel melisma's historical, physiological, and pedagogical aspects

- Key findings: Evolution of melisma, breath control, agility, improvisation. (Boyer, 1995; Legg & Philpott, 2015; Sellers, 2009)

Visual Feedback

- Evolution from oscillographs to real-time feedback (Howard et al., 2004)
- Pitch accuracy improvements (Wilson et al., 2008)
- Genre-specific research gap: Western classical focus

Pitch Accuracy

- Challenges in measuring pitch accuracy in gospel
- Expressive deviations in gospel melisma
- Need for standardised measures in gospel performance

(Pfordresher and Brown, 2007)

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LITERATURE REVIEW

Theoretical Frameworks

- TAM: Usefulness, ease of use of visual feedback (Venkatesh & Davis, 2000)
- CLT: Cognitive demands during gospel riff singing (Sweller, 2010)

Gospel Melisma Challenges

- Emotional expression in gospel riff singing (Robinson-Martin, 2010; Legg, 2009)
- Mixed findings on pitch accuracy
- Improvisation challenges for visual feedback systems

Gaps in Literature

- Limited research on culturally sensitive feedback approaches
- Lack of adaptive systems for improvisation
- Inadequate exploration of gospel-specific pitch accuracy tools



ETHICAL CONSIDERATIONS

Participant well-being

- Emotional impact of feedback (Welch, 2014)
- Supportive environment (Dibben, 2017)

Cultural sensitivity:

- Respect for beliefs and customs (Nekola & Wagner, 2015)

Privacy & data protection:

- Anonymity and GDPR compliance (Information Commissioner's Office, 2018)

Informed consent:

- Clear communication of risks and parental consent (Alderson & Morrow, 2011)

Insider Research:

- Reflexive practice, peer debriefing, and data triangulation (Berger, 2015)

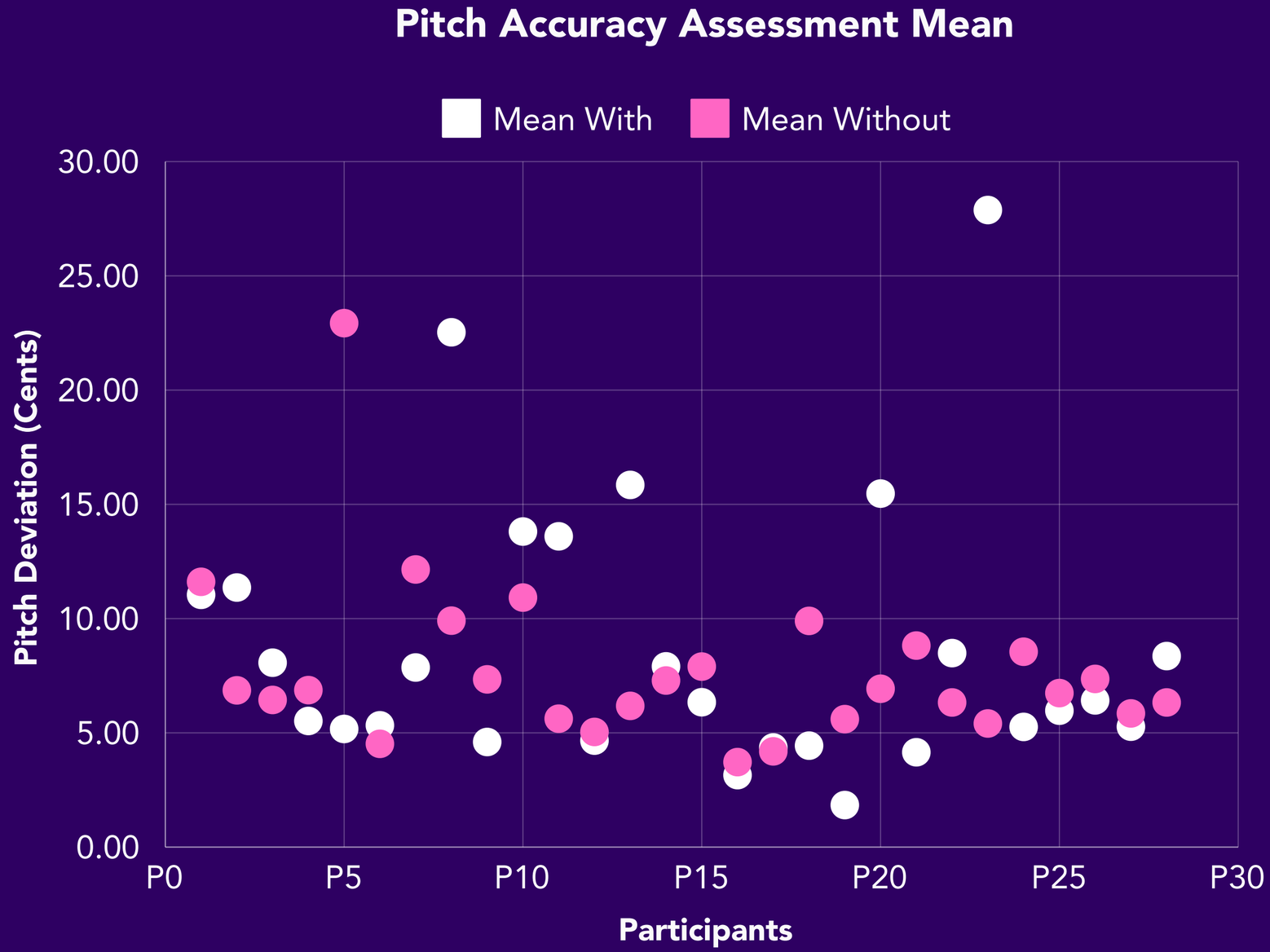
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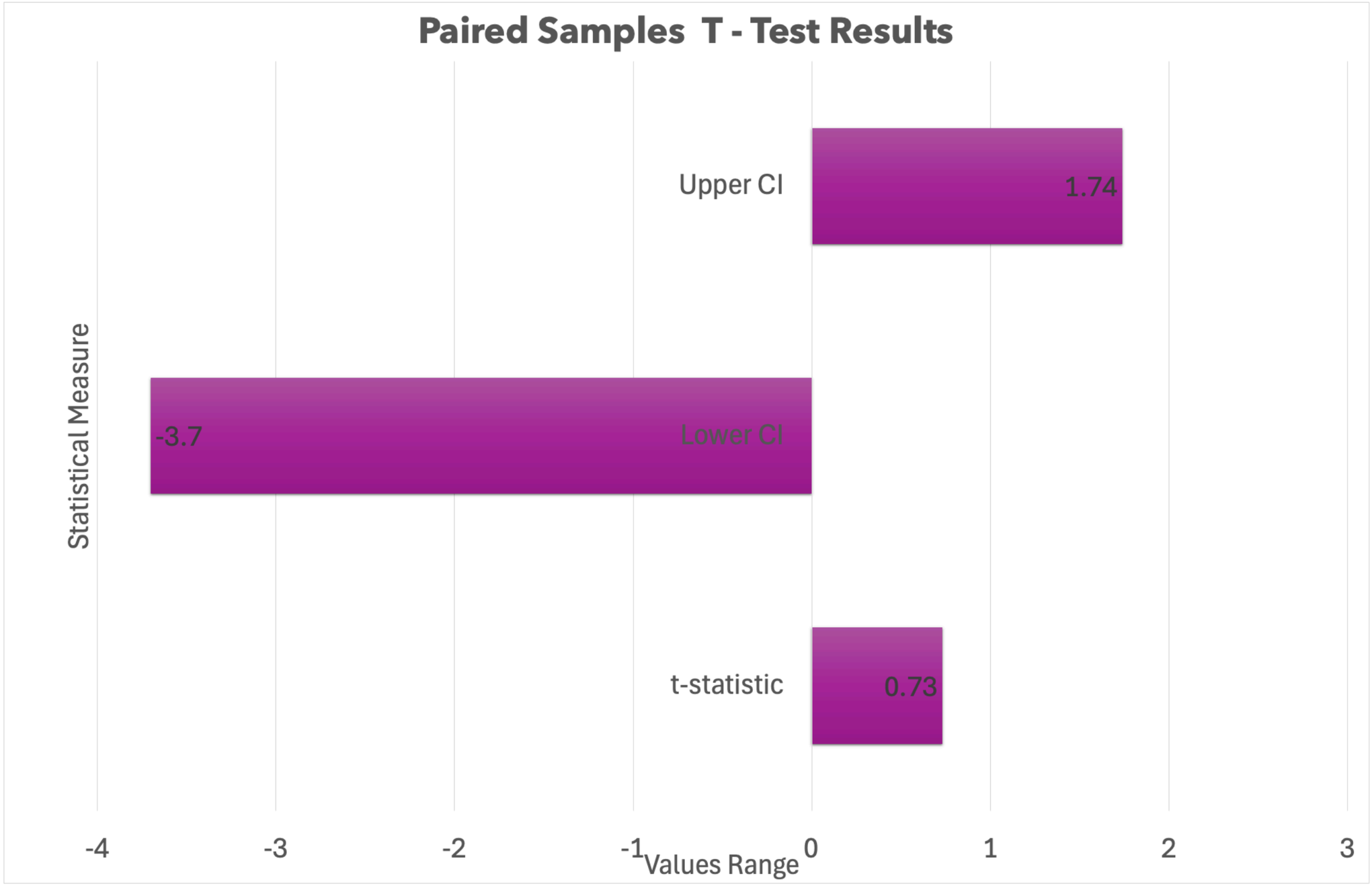
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FINDINGS

Quantitative

Impact of RVF on Pitch Accuracy
Pitch deviation(in cents) was measured in two conditions:
With Feedback: M = 8.73, *SD* = 5.97
Without Feedback: M = 7.76, *SD* = 3.66




Paired Samples T - Test Results
Upper CI
1.74
-3.7
Lower CI
t-statistic
0.73
Statistical Measure
-4
-3
-2
-1
0
1
2
3
Values Range

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FINDINGS



Effect Size

Cohen's d = -0.139, Hedges' g = -0.135
Suggests small negative effect of RVF on pitch accuracy
95% Confidence Intervals cross zero
Cohen's d: [-0.51, 0.23]
Hedges' g: [-0.49, 0.22]

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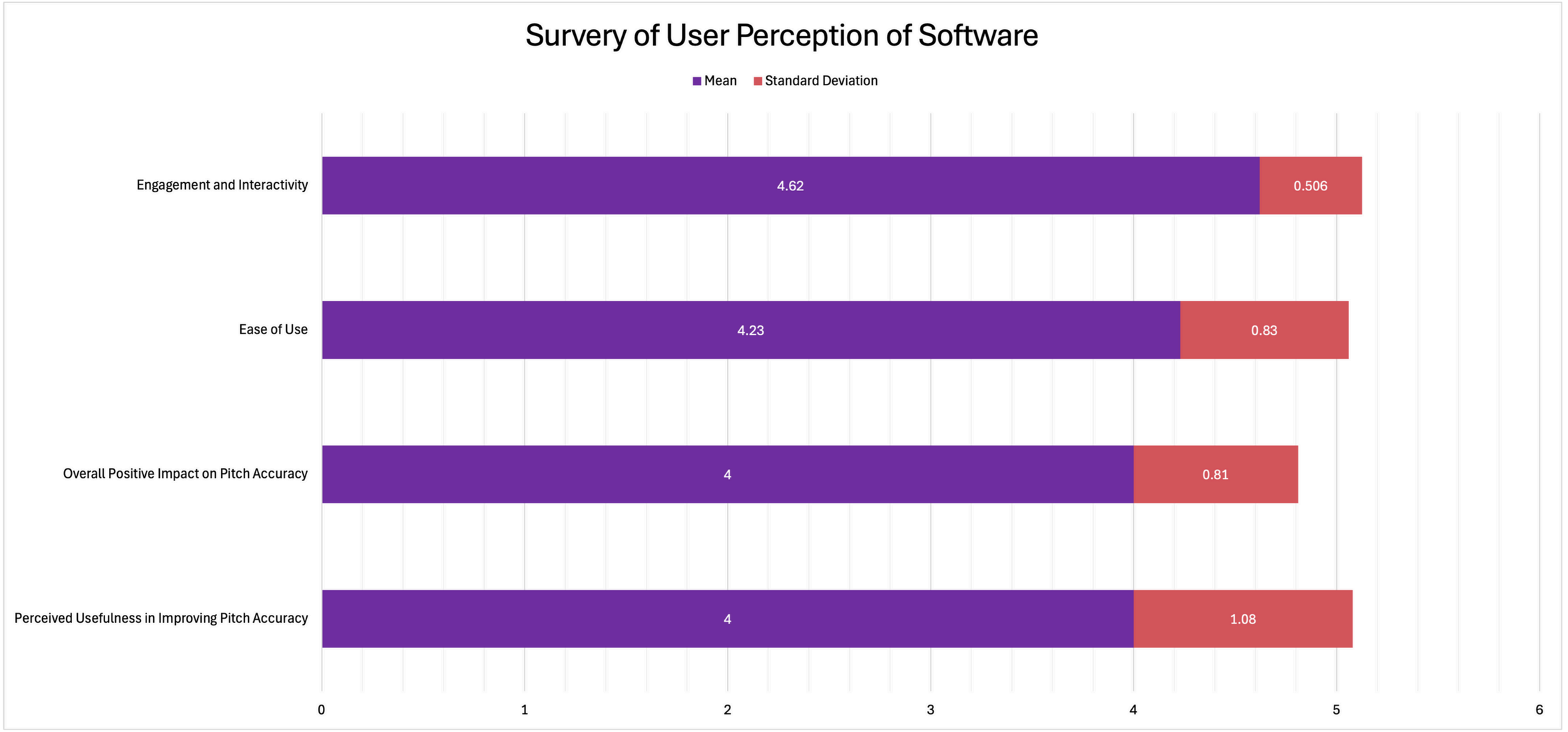
FINDINGS

Conclusion: Impact of RVF on Pitch Accuracy

- No significant improvement in pitch accuracy with RVF technology
- Small, inconsistent effect across participants
- $t(27) = -0.73$, $p = 0.46$
- 95% Confidence Interval: [-3.70, 1.74]
- Conclusion: RVF may not consistently enhance pitch accuracy in gospel melisma

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FINDINGS



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FINDINGS



Correlation (Feedback Utility & Confidence): r = 0.945, p < 0.01

Conclusion:

Positive reception of the software

Strong link between feedback utility and confidence in performance

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QUALITATIVE FINDINGS

FOCUS GROUPS

Thematic Analysis

1.Visual Learning and Representation

"I liked to see the visual representation... It made me realise how much variation there actually is in what I thought was a steady note" (P6).

2. Learning Progress and Development

"I need to see a baseline... Without it, it's hard to know if I'm actually improving or just seeing random patterns" (P6).

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QUALITATIVE FINDINGS

FOCUS GROUPS

Thematic Analysis

3. Feedback Interpretation Challenges

"I was kind of relying on my common sense on what the graph represents... steady, symmetrical peaks and troughs mean consistent pitching, but it'd be good to know more about it" (P4).

4. Self-Assessment and Correction

For me, it was useful to see where I was dropping off in the pitch, so I could correct that part and do it over again" (P3).

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QUALITATIVE FINDINGS

SEMI STRUCTURED INTERVIEWS

Thematic Analysis

1. Visual Learning and Representation

It was interesting to visualise what my voice was doing. It helps you realise how much variation there is within the one note you're singing' (P16).

2. Technique and Performance

You're seeing where your vibrations are different... It helps you be more aware of your overall delivery' (P9)

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QUALITATIVE FINDINGS

SEMI STRUCTURED INTERVIEWS

Thematic Analysis

3.Learning Preferences and Methods



At first, it helped me, but by the third time, I was overthinking and got it completely wrong' (P16).

4.Technology and Usability



This would be an amazing tool for vocal training, especially for groups... It would make it easier to identify and work with individuals pitching wrong' (P16)

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QUALITATIVE FINDINGS

REFLECTION JOURNAL

Thematic Analysis

1.Navigating the Challenges of Insider Research

I need to be cautious not to let my preconceptions influence the analysis. It's easy for my insider knowledge to shape the direction of the research.

2.Cultural Sensitivity and Representation

Most participants looked away during the initial experiment, highlighting a challenge: the visual element can be difficult for a culture that traditionally internalises sound to create or replicate complex melismas.

3.Methodological Rigour and Adaptability

'I'm realising the importance of having a well-planned data analysis strategy, while also being open to cultural influences on learning and performance.

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QUALITATIVE FINDINGS

REFLECTION JOURNAL

Thematic Analysis

4. Developing Research Skills and Confidence

'Grappling with coding has been difficult... but I am starting to see patterns, especially in how cultural context influences learning.'

5. Ethical Considerations and Participant Relations

'It is vital to honour participants' cultural background, particularly in gospel music.'

6. Reflective Practice and Future Directions

'Regular reflection on how gospel traditions can coexist with modern training tools has been invaluable. The community is longing for teaching strategies to support melisma learning'

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ANALYSIS

Quantitative: No significant improvement in pitch accuracy
Qualitative: Enhanced perception of vocal control and technique
Cultural insight: Precision may not be primary goal in gospel singing

DISCUSSION

1. **Broader Evaluation: Incorporate learner perceptions, cognitive engagement, and cultural aspects.**

2. RVF Technology: Use as a supplementary tool, not a replacement.

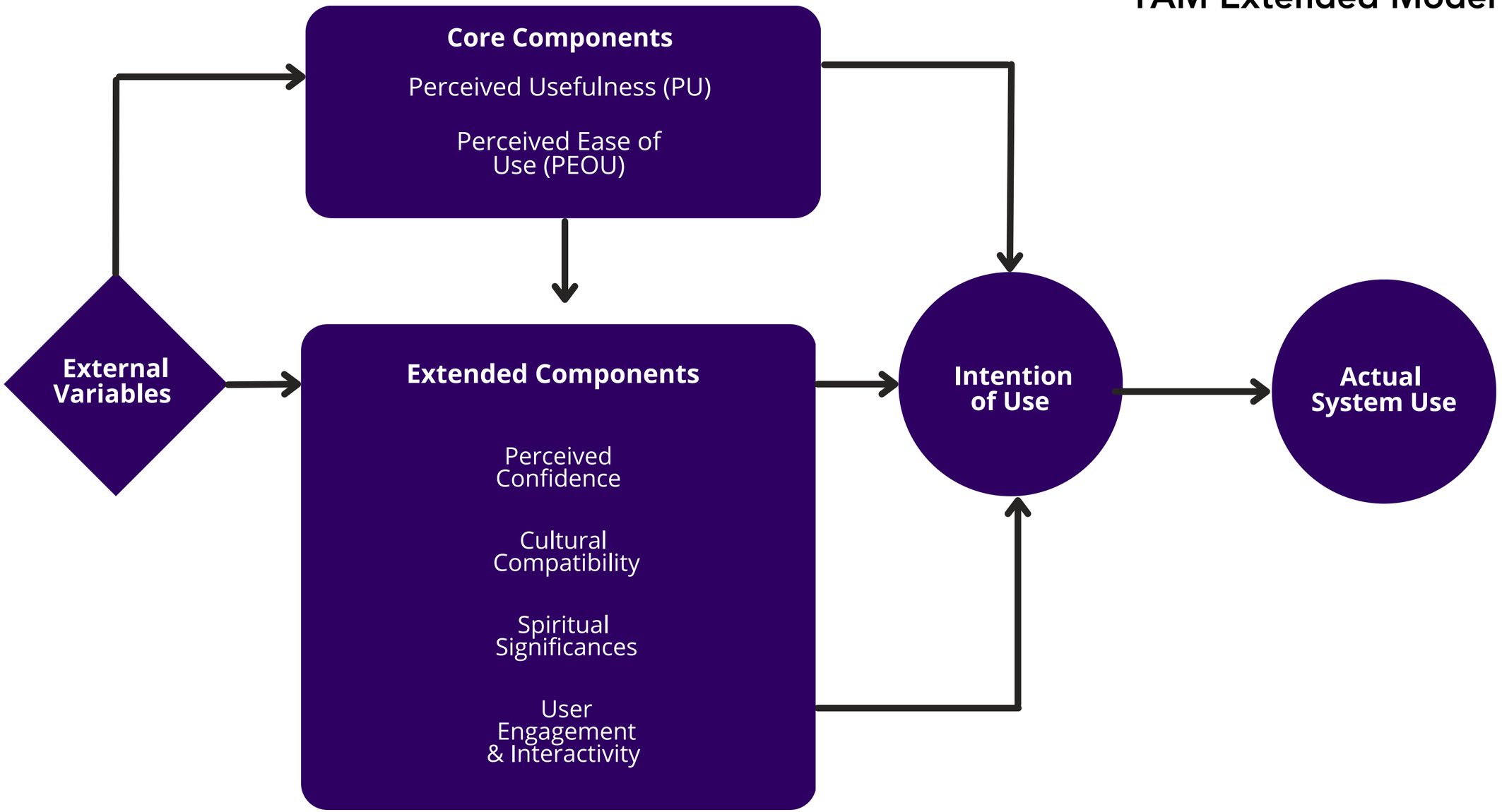
3. Methodology: Mixed-methods provided insights; longitudinal studies needed for long-term impact.

4. Cultural Tension: Conflict between visual learning and gospel's ear-based traditions.

5. Cognitive Load: RVF increased load initially but improved metacognitive understanding over time.

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TAM Extended Model



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LIMITATIONS

1. Small sample size (n=28 main study, n=11 survey)
2. Focus on short-term effects
3. Specific technology limitations
4. Researcher's insider status
5. Lack of control group
6. Measurement tool limitations
7. Limited exploration of individual differences

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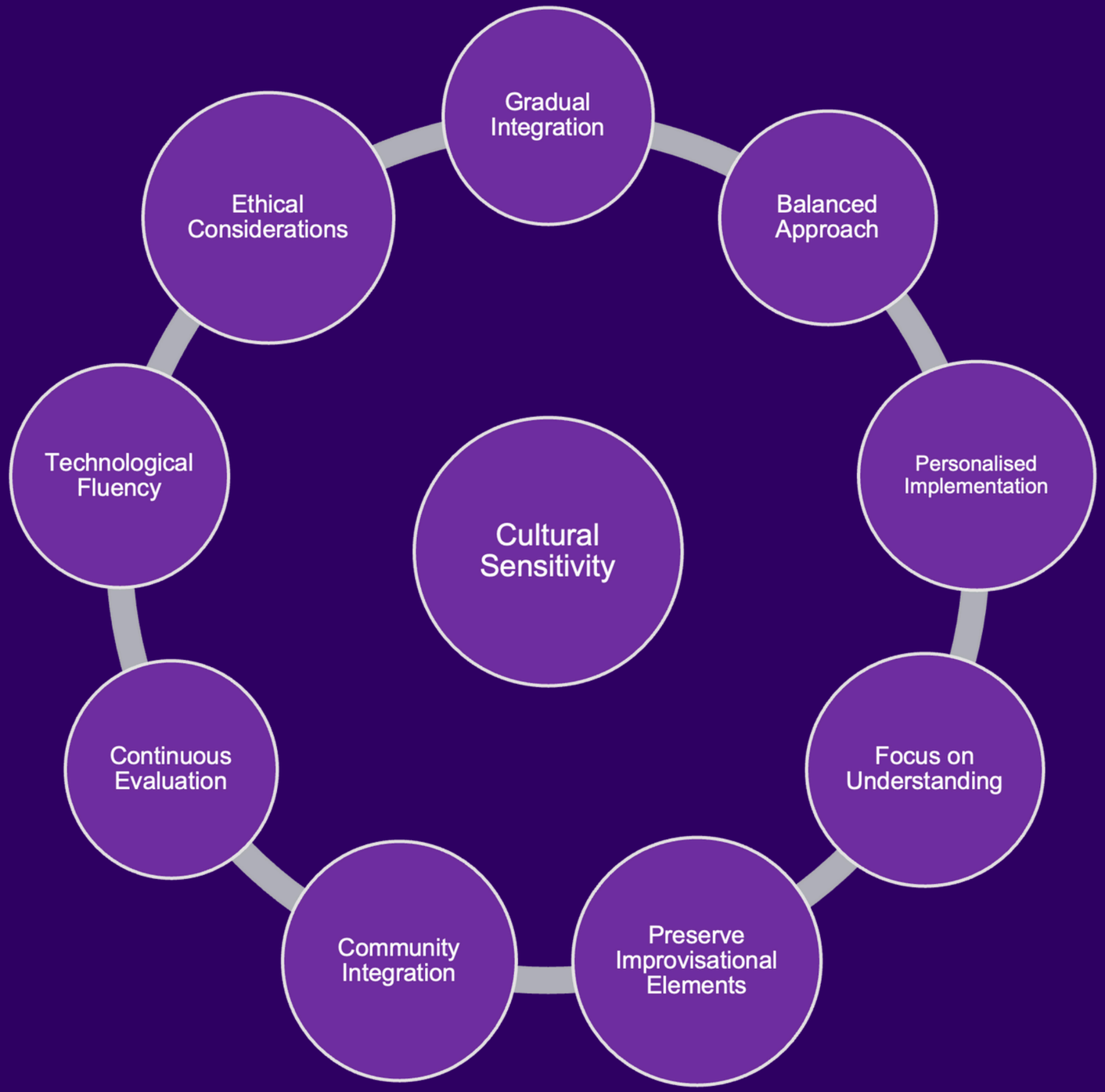
CONCLUSION & FUTURE DIRECTIONS

Prioritise for future development:

1. Cultural sensitivity
2. Adaptability to individual learning styles
3. Balanced integration with traditional methods
4. Long-term studies
5. Culturally appropriate metrics
6. Goal: Effective and respectful technology integration in gospel music pedagogy

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Best Practices for Integrating RVF in Gospel Music Pedagogy



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