Quantifying Perishability in Skills: A Critical Review

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Background

In all stages of the lifespan motor skills play a critical role and are developed as people perform different fundamental motor skills.[1]

Work place skills require special training and knowledge, so as to develop the technical sequencing necessary to perform these skills at high quality and efficiency levels.[2]

Skill perishability can occur for a wide range of different reasons so skills need to be practised and implemented on a daily basis to maintain high execution levels.

If a skill cannot be practised for long periods of time, a decline in execution is observed.[3]

Aims/Purpose

The aim of this critical literature review was to identify, critically appraise and synthesize key findings from the current body of literature on perishability of skills within different workplaces.

Methods

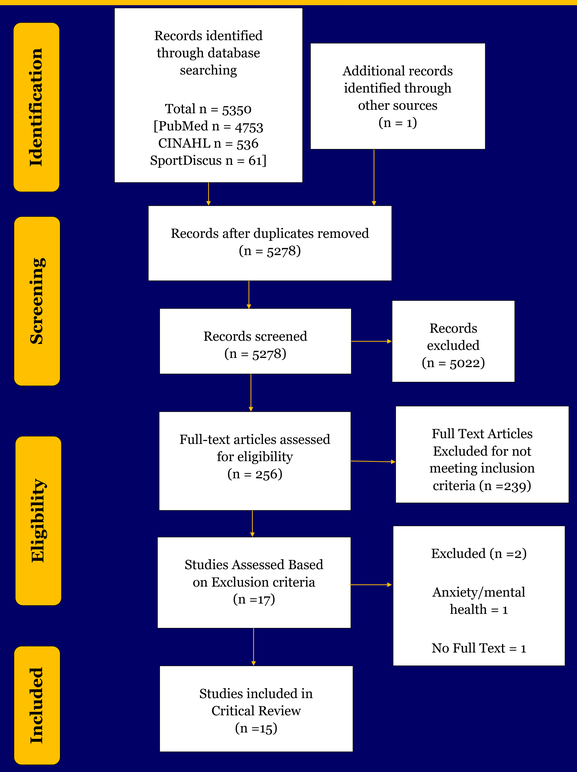
A two-tiered approach was used to gather studies to inform this review. The process of identifying and selecting studies is demonstrated in the PRISMA diagram (Figure 1) which outlines the overall process.

All included studies were critical appraised using a modified Downs and Black checklist.[4]

A Cohen's Kappa analysis was performed to assess agreement between raters and provide a subsequent consensual critical appraisal score (CAS).

Once the final studies were selected, evaluated and graded, key data were extracted.

Figure 1. PRISMA Flow Diagram detailing the screening process of the critical literature review



Results

The mean CAS was 65.5% and ranged from 50% to 83.9%. CAS of all included studies are shown in Figure 2. with a substantial agreement between raters (K=0.747).

The synthesized data from selected studies is shown in Table 1

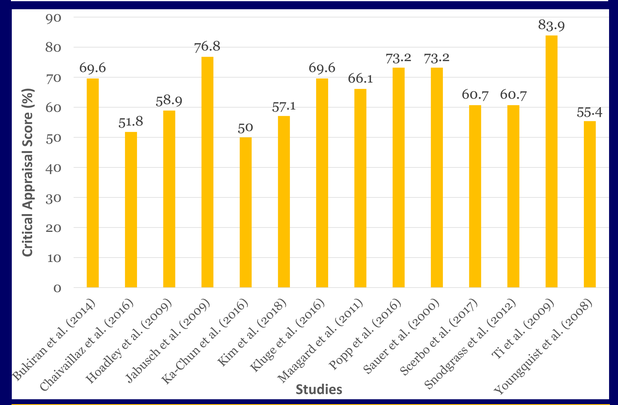


Figure 2 Critical appraisal scores for included articles of this critical review

Table 1. Key skill retention information from included articles of critical review

Author, Year & Skill Tested	Retention Interval	Main Findings and Conclusion
Brooks et al. (2016) ECG Interpretation	Retest at 3 & 8 Weeks	Test scores decreased by 26% reflecting a decrease in clinical competency
Bukiran et al. (2014) Basic life support and Advanced cardiac life support	Retest immediately post, 6 months and 12 months	Knowledge levels seen to decline early, generally after 6 months
Chaivaillaz et al. (2016) Managing a complex simulation	Retest after 1 week and 8 months	Providing automation to participants may prevent decrements in diagnostic performance
Hoadley et al. (2009) Advanced Cardiac Life Support after low simulation or high simulation training	1 day and 3 days post	High simulation training did not produce higher skills scores
Jabusch et al. (2009) Motor Skills	Pre-test and Post-test (average time of 27 months +/- 8 months)	There is a strong influence of practice quantity and long-term maintenance of motor skills
Ka-Chun et al. (2016) Surgical Tasks	1 week and 1 month post baseline	Virtual Reality training can improve the level of skill learning and decay
Kim et al. (2018) Discrete sequence production tasks	1 day and 3 days post	Random practice supports superior delayed retention
Kluge et al. (2016) Non-routine water system task	Reassessed at two weeks	After a two-week retention interval without a refresher intervention, skill decay occurs
Maagaard et al. (2011) Laparoscopic surgery skills	Immediately post, 6 and 18 months after initial training Experts only tested at 6 months	Skills are retained for a period of 6 mths, but after 18 mths without training the skills are lost
Popp et al. (2016) Airway management skills and knowledge	Control: 1 week, 6 months Experiment: 1 week, 1 month, 3 months and 6 months	Knowledge was retained over a 6-month period, however OPA and NPA skills decayed over that time
Sauer et al. (2000) Complex system management	Assessed immediately post intervention and after an 8-month layoff period	Primary task performance was maintained, secondary task performance was impaired
Scerbo et al. (2017) Laparoscopic Suturing and mental workload	Reassessed after either 1 or 5 months without practice	Performance deficit in novices, however, this decrease in performance was nearly revered in 40 minutes of additional practice
Snodgrass et al. (2012) Lumbar mobilisations	1 week and 3 months post intervention	Students demonstrated learning over a one-week period of practice, but retention over 1 week and 3mths without practice is poor
Ti et al. (2009) Endotracheal Intubation after experiential or guided intervention	3, 6, 9- and 12-months post intervention	Novices learnt better with experiential learning for EI and refresher training should be given every 3 mths to prevent decay
Youngquist et al. (2008) Paediatric Airway Management	Variable from 1 month to 2 years	Skill performance is enhanced by a training program that is facilitated by an onsite instructor EI and BMV skill retention is relatively poor

Summary & Conclusions

The evidence suggests that a degree of skill perishability may occur during a given time interval (e.g. airway management skills may decline as early as 6 months) with or without practice.

Novices are particularly vulnerable to skill perishability when compared to experts because of their inexperience in a job or situation.

Ongoing practice and continued refresher training to combat skill decay and perishability is required with the degree of refresher training dictated by the complexity of the task to be performed.

Some methods of training (e.g. random practice or blocked practice) may be more appropriate at delaying skill decay.

Though skill perishability is varied from skill to skill, there is no clear research to identify the exact degree of skill decay when additional skill retention factors and skill complexity are considered.

It is clear from this review that refresher training, particularly for novices, should be performed regularly to combat skill perishability.

References

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