Optimizing Knowledge Delivery and Retention in Educational Curricula in Graduate Medical Education Programs: The Perspective of Trainees in Internal Medicine and Hematology/Oncology

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Introduction

Medical knowledge is an ACGME core competency that should be mastered by the end of post-graduate training. Balancing the role of student and provider presents challenges to the learning progression proposed by Bloom's Taxonomy, with the learner potentially applying knowledge during patient encounters without thorough understanding of knowledge applied, creating a false impression of knowledge mastery, when knowledge gaps truly exist. Building a strong foundational knowledge base in our trainees is essential. Despite exponential growth in medical knowledge, graduate medical education (GME) curricula continues to rely on traditional lectures, inconsistent patient care experiences, and learner-driven self-study to achieve knowledge competencies. Microlearning and spaced repetition may benefit the busy learner. Understanding our trainees' learning preferences will help us develop and implement desired, effective teaching tools, potentially reducing knowledge gaps.

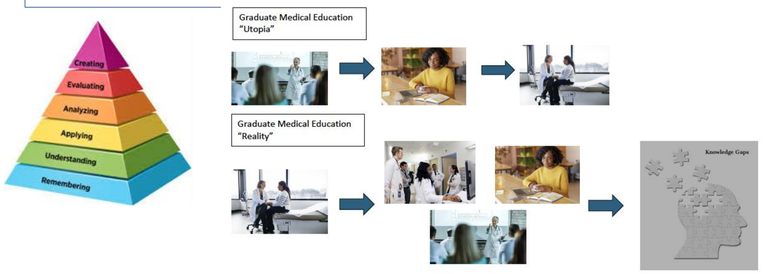


Table 1. Presumed Etiologies for Knowledge Gaps

	Clinical Teaching	Teaching Conferences	Independent Self-Study
Learner-specific	Varied exposure to patients at varied moments in management	Inconsistent attendance due to service responsibilities	Lack of time due to service responsibilities
	Excessive service responsibilities	Limited attention due to service-related distractions	Ineffective or lack of formal study schedule
	Varied learning preferences	Cognitive overload	Lack of knowledge about best study resources
	Inadequate supplemental reading	Inadequate supplemental reading	
	Knowledge retention	Knowledge retention	Knowledge retention
Faculty-specific	Lack of expertise	Excessive teaching material	
	Lack of time for teaching due to patient load/non-patient care obligations	Lack of learner engagement/passive learning	
	Lack of preparation time for teaching	Teaching material not at the level of the learners	
	Inadequate teaching tools to assist with clinical teaching		
Program/Institution-specific	Inappropriate patient volume per learner (excessive or low)	Insufficient time for teaching conferences	Lack of involvement with self-study plans and resources
	Inadequate support for non-medical management	Inadequate procedures to protect time for learning	Inadequate learning resources to promote knowledge retention
	Inadequate staffing	Teaching conference format limited to traditional didactic lectures	
		Missing topics in educational curriculum	

Objectives and Methods

Objectives: Our aim is to gain insight from residents and fellows about 1) preferred teaching/learning strategies in the clinical environment, teaching conferences, and independent study; 2) prior experience and preference for microlearning and spaced repetition in learning curriculum; and 3) learning barriers.

Methods: A RedCap survey was launched to internal medicine residents at Baylor College of Medicine (BCM) and St. Vincent's Hospital and BCM hematology/oncology fellows.

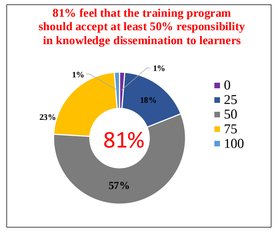
Results/Discussion

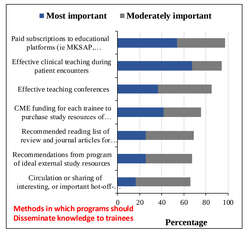
General Perception about Learning in GME Programs

Table 2. Baseline Characteristics of Respondents

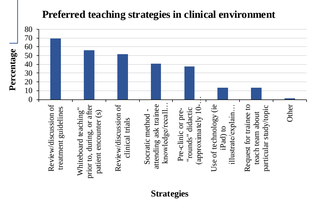
	N= 84
Specialty/Subspecialty	
IM Residency	47 (55%)
Hematology/Oncology Fellowship	38 (45%)
PGY Classification	
PGY1	9 (11%)
PGY2	25 (29%)
PGY3	11 (13%)
PGY4	20 (23%)
PGY5	10 (12%)
PGY6	10 (12%)

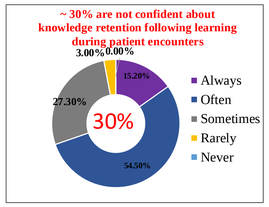
*61% Response Rate

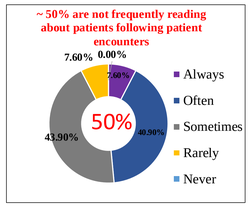


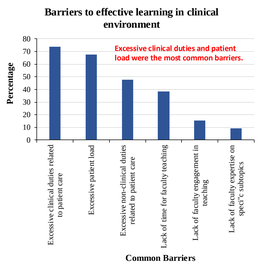


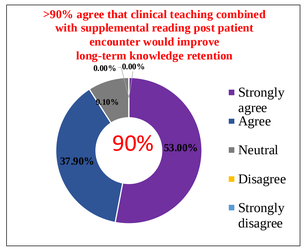
Clinical Teaching

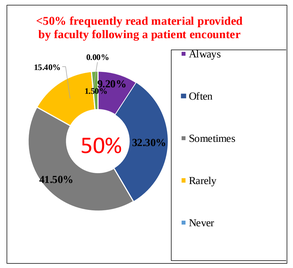




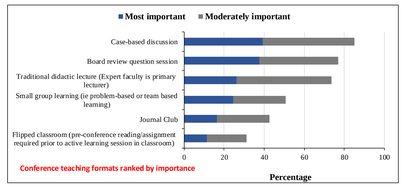


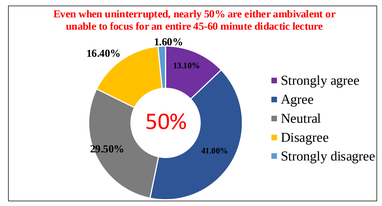


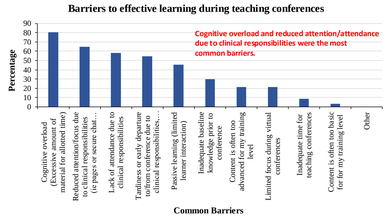


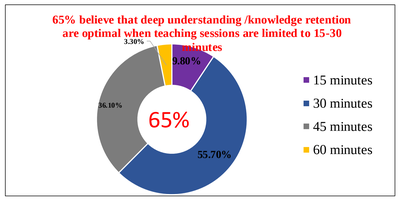


Teaching Conferences

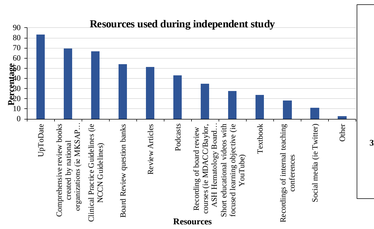


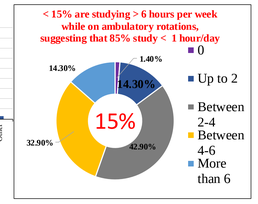


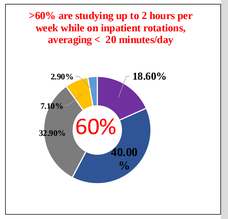


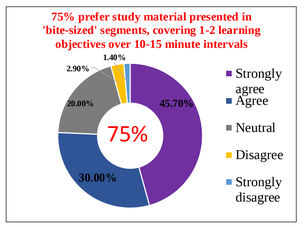


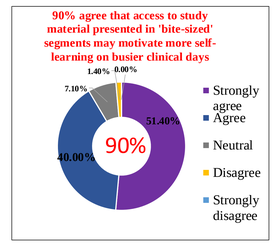
Independent Study



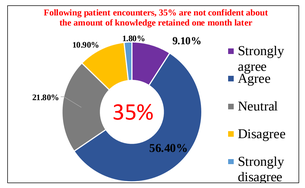


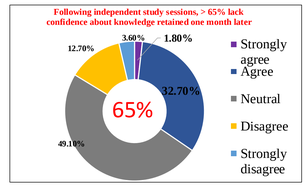


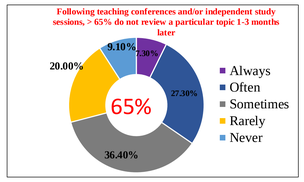


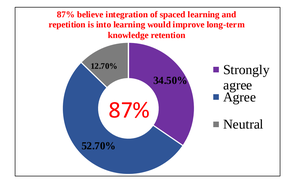


Knowledge Retention/Spaced Repetition









Conclusions/Future Directions

Conclusions: GME learners desire their training programs to have active involvement in knowledge dissemination to trainees, largely by providing access to educational resources, an educational clinical environment, and effective teaching conferences. Though many traditional teaching strategies and resources utilized in GME are still preferred, a substantial number of trainees are unclear on how effective these strategies and resources deliver knowledge and maintain knowledge retention. Lack of time is a barrier in all learning domains, suggesting that more resources and teaching that embrace microlearning may be beneficial. In addition, spaced repetition learning may further improve knowledge retention. Last, service responsibilities are major barriers to learning and should similarly be addressed at the program/institution level.

Future Directions: Expansion of this survey to a broader audience, including more medicine subspecialty fellowship programs and training programs across other institutions will increase the power of this study. Development and implementation of teaching tools incorporating microlearning and spaced repetition, followed by interventional studies testing the effect on learner satisfaction and knowledge assessments may determine if these modifications may help reduce knowledge deficits in GME learners.