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The Clinical Educator's Guide to Fostering Learner Motivation

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## INTRODUCTION

Learner motivation is essential at every level of education, from student to professional, and in every setting, from lecture halls to simulation laboratories to clinical placements. Without a desire to learn, learners will not put forth the necessary effort to learn (Bandura, 1977, Cook and Artino Jr, 2016). Not only do individuals with strong motivation put forth more effort, but also they are more resilient to the inevitable setbacks that arise when learning challenging concepts or skills. Clinical educators, within and outside the classroom walls, play a key role in learner motivation through the design of the learning activities, implementation of instructional strategies, and creation of positive learning environments (Kusurkar et al., 2011b). For instance, a health professional student may find a placement more motivating due to the variety of tasks, enthusiasm of the supervisor, and quality of feedback they received. This motivation then may lead the student to read more, engage in additional learning activities, and ask better questions.

There are several motivation theories that attempt to understand what influences learner effort, interest, and ownership in the learning process.

- Self-determination theory posits that internal motivation is fostered when learners' needs are met for autonomy (control over one's actions), competence (self-efficacy), and relatedness (sense of belonging and connectedness) (Ryan and Deci, 2000b).
- Goal-orientation theory centers around what influences the learners' motivations for achievement. When oriented toward *performance* goals (e.g., earning high grades), learners are primarily concerned about the judgment of others (e.g. the educator's evaluation). In contrast, learners with a *mastery* goal orientation, are motivated by the intrinsic value of what is being learned (Elliot and Hulleman, 2017).

- Attribution theory suggests that learners' interpretations of their successes and failures are what matters. Learners attribute success or failure in varying degrees to personal effort, innate ability, other people, and luck. These attributions, in turn, influence their future belief in the likelihood of their success (Weiner, 1985).
- According to expectancy-value-cost theory, motivation is influenced by the degree to which the learner believes they will be successful (expectancy), perceives the task as important (value), and considers the task-related downsides (costs) (Barron and Hulleman, 2015).
- Situative learning theory postulates that students are motivated by a desire for social standing. What matters in situative learning theory is tapping into the learner's desire to be a respected member of the health care community (Lave and Wenger, 1991).

Although there is no "silver bullet" strategy to optimise learner motivation, over 70 years of research has produced persuasive evidence on what motivates learners (Bandura, 1977, Maslow, 1943, Cook and Artino Jr, 2016, Lepper et al., 2005). Motivation to learn is ultimately the responsibility of learners; however, educators play an important role in influencing learner motivation. Authors have summarized numerous instructional interventions designed to increase learner motivation, including the use of stories, mindset interventions, and improving instructor-learner relationships (Lin-Siegler et al., 2016). Other tactics that instructors have applied successfully include using an instructional game (Klein and Freitag, 1991), focusing on making content relevant to learners (Frymier and Shulman, 1995), and implementing concept trees to gain attention (Hirumi and Bowers, 1991).

### **The Challenge for Clinical Educators**

Health professions education would benefit from a greater application of theory-based, research-proven learning motivation strategies. However, much of the student motivation literature is directed at an educational psychology audience who is familiar with

the professional jargon and is comfortable with interpreting learning theory. Thus, motivation theory and research may be less approachable for many clinician educators. Also, student motivation literature is large and overlapping. It would be difficult for a new clinical educator to understand how each motivation theory fits into the broader picture of learning theories. Furthermore, to be successful, clinical educators need to not only *know of* a wide variety of instructional strategies, but also have an understanding of the who, what, where, when, why, and how for each instructional strategy. This can be overwhelming.

### **Applying Familiar Metaphor to Motivation Theory**

To make motivation theory and research more approachable, we have translated motivation theory and research into language familiar to health professionals. Similar to *medicine treatment* monographs in drug compendia, we have categorized interventions for fostering student motivation into *strategy* monographs describing their indications, mechanism of action, administration, dosing, side effects, and monitoring. Table 1 compares these terminologies.

Although we and many others argue that learning science is more cultural and context-dependent than clinical science (Brown et al., 1989), clinical educators can still apply their understanding of clinical science to the science of motivation. As a simplification, motivation can be viewed as systems of sources, processes, influencers, and outcomes. The best way to improve motivational outcomes (e.g., effort) is to carefully evaluate and target the factors related to learner motivation (Harackiewicz and Priniski, 2018). In motivation, the factors related to learners' behaviours may be their beliefs around learning, the task, the environment, their peers, and the educator. For example, a student may be putting forth minimum effort on a critical care placement because they want to practice in primary care and do not see how the learning about critical care will be important to their future. Therefore, akin to how medical treatments should be personalized to patient characteristics

and preferences, strategies to improve learner motivation must be personalized and modified over time. What may engage students one day, may not work the next. What is interesting to one student, may not be interesting to another. Therefore, it is crucial for educators to not only know the types of tactics for fostering learner motivation but also to understand why and how these tactics work.

To assist clinical educators, we have categorised interventions that foster learner motivation into three groups based, in part, by work from Vansteenkiste and colleagues (2009). In the same way, these interventions target learner motivation via different pathways:

- Increasing motivation *intensity* - includes interventions to increase (i.e., strength, quantity) learner motivational state, willingness, and behaviour for a specific action (Vansteenkiste et al., 2009)
- Enhancing motivation *quality* - includes interventions to influence the type of motivation for the learner (i.e., why they are engaged in the activity).
- Improving motivation *know-how* - includes interventions to increase learner knowledge of tactics and strategies for motivating oneself (i.e., motivation regulation strategies).

In the following sections, we describe the underlying theories of each therapeutic class including origins, mechanisms, and outcomes. We outline specific strategies (i.e., interventions) educators can use and the evidence to support them. We describe examples of how clinical educators may implement the interventions in different settings (i.e. clinical placements, the classroom, and online learning). In each section's corresponding table, we outline key terms, indications, general administration, mechanism of action, dosing, side effects, and monitoring.

## **THERAPEUTIC CLASS 1: INCREASING MOTIVATION INTENSITY**

### **Overview and Theoretical Underpinnings**

The strength (i.e., intensity) of learner motivation is determined by the motivational state (e.g., “I feel motivated”), displaying certain behaviours (e.g., participation), and holding motivational beliefs and perceptions (e.g., “I’m confident I will do well”). Motivational beliefs and perceptions include:

- Learner perceptions of task difficulty (McCaslin and Hickey, 2001)
- Task importance (Wigfield et al., 2017)
- Perceptions of educator caring (Wentzel and Wigfield, 1998)
- Learner interest (Renninger and Hidi, 2011)
- Perceptions of self-competence (Schunk and Pajares, 2005)

Positive motivational beliefs and perceptions lead to heightened motivational states, engagement, and behaviours (Wigfield and Guthrie, 2000). When motivational beliefs and perceptions are optimised, learners use a deeper approach to learning (Heikkilä and Lonka, 2006) and adaptively regulate their own learning (Paris and Turner 1994). For example, a learner with a developed interest in a subject (e.g., cardiology) is more likely to be behaviourally engaged (e.g., reading additional materials) and seek future opportunities in that subject (Renninger and Bachrach, 2015). The learner might read about a disease state without prompting and ask for additional practice opportunities. Motivational states and behaviours also serve as a mediator between instruction and learner achievement (Wigfield and Guthrie, 2000). For example, a learner with more behavioural engagement may then achieve higher marks and test scores, attain an internship, and positively affect the care of patients. Motivational beliefs and cognitions directly predict effort, persistence, and choices (Wigfield et al., 2017), which, in turn, predict success in school, the workplace, social settings, and daily living (Marsh et al., 2017).



### **Four Interventions to Increase Motivation Intensity**

To increase the level of motivation intensity, clinical educators should:

- Provide optimally challenging learning tasks
- Spark curiosity and interest among learners
- Model enthusiasm and show affective concern
- Create task relevance and utility

See Table 2 for four exemplary interventions under this therapeutic group that can increase the intensity of learner motivation. Other intervention types and examples, under this therapeutic class, may be found for increasing learner interest (Harackiewicz and Priniski, 2018) and perceptions of their own competence (Bandura, 1997).

**Providing optimally challenging learning tasks.** Learner perceptions of task difficulty matters (McCaslin and Hickey, 2001, Paris and Turner, 1994). When selecting and designing learning tasks, educators should follow the Goldilocks Principle of not too easy and not too hard – a task should be challenging, but not overwhelming. For example, placement supervisors could optimise the number and complexity of patients they assign for students to review, assigning more difficulty as the challenge decreases for the student. In the classroom, educators could optimise the difficulty of the questions they ask. If the task is too easy, learners may become bored, yet with too much difficulty; learners may withdraw or take mental shortcuts. This principle is also applicable to online learning. One way to design online learning could be modelling online learning after video games. Video games increase the level of difficulty after learners master easier tasks. For example, an online module could require mastery quizzes before moving onto content that is more difficult and subsequently more difficult quizzes.

Optimal challenges may also lead to “flow” (Csikszentmihalyi, 1997); an absorbing state of motivation that learners experience, losing their sense of time. For example, a learner

may become absorbed trying to find an answer to a question, searching journal articles for hours. When a learner succeeds over an optimally challenging task, the result is an increase in their competence self-perceptions (e.g., confidence, self-efficacy) (White, 1959, Marsh et al., 2017).

**Sparkling curiosity and interest.** If learner interest and curiosity is triggered, it may lead to well-developed personal interests (Renninger and Hidi, 2011). At the beginning of the learning experience, educators may identify ways to spark learner interest through novelty, surprise, and debate. For example, learner interest may be peaked when clinical supervisors discuss clinical controversies. Classroom educators can create surprises by having students predict answers to questions before they reveal the answer. For online learning, novelty is often used. In fact, perceived novelty predicts learner motivation for education technology. However, the “novelty effect” is known to fade over time (Jeno et al., 2019).

**Modelling enthusiasm and showing affective concern.** Learner motivation may increase due to their relationship with and perceptions of the educator. Learners often describe their preference for enthusiastic educators (Mitchell, 2013). An interest in a topic can be contagious, especially when the learner respects or relates to that person. Anecdotally, many learners indicate they chose a profession, specialty, or practice setting due to a former teacher’s passion. Many educators often reveal their enthusiasm when they share their stories for why they enjoy a topic or believe it is important. For example, many learners are moved by stories connecting their learning to real patients.

Another motivating aspect of the educator-learner relationship is how much a learner believes their educator cares for their well-being. Learners subconsciously feel dignity and belonging when they believe their educator cares for them as a person (Baumeister and Leary, 1995). Dignity and belonging are fundamental to student motivation. Without dignity or belonging, learners are likely to withdraw and think the learning topic or environment is

“just not for them.” In clinical placements, clinical educators could show caring by checking in with students and asking them how they are doing. Classroom educators could show they understand students’ studying and time management pressures.

**Creating task relevancy and utility.** The learner’s perceptions of the relevance and usefulness of the learning task determine the strength of their motivation (Eccles, 2005).

Learners perceptions of task value and are determined by:

- Attainment value - relative importance for succeeding
- Utility value - importance for the future
- Intrinsic value - inherent enjoyment from task

Contrary to commonly seen practices, it is important to *show* learners the value of the task rather than *tell* them. Telling learners the importance of the task can backfire (Harackiewicz and Priniski, 2018). Instead, clinical educators should either show the importance or have the learner advocate for the task’s value. For example, a clinical educator might demonstrate taking a comprehensive patient history and show how this led to an improved patient outcome. A classroom teacher or educational technology could have learners respond to prompts asking them why a topic or task is important to their current lives or their future (i.e., have learners advocate for task value).

## **THERAPEUTIC CLASS 2: ENHANCING MOTIVATION QUALITY**

### **Overview and Theoretical Underpinnings**

The quality of learner motivation is determined by learners’ mindsets, sources for goals, and attributions for their competence. Motivation quality is associated with engagement, effort, persistence, and long-term achievement. Interventions that enhance motivation quality increase the learner’s:

- belief that competence is malleable (i.e., growth mindset) (Dweck and Molden, 2017)

- autonomy (e.g., intrinsic motivation) (Ryan and Deci, 2000b)
- desire to achieve content mastery balanced with a focus on performance goals (i.e., mastery and performance approach goal orientation) (Elliot and Hulleman, 2017), and
- identity formation within a profession or school (Lave and Wenger, 1991),
- feelings of belonging (Baumeister and Leary, 1995)
- belief that their effort and strategy are causally related to their academic failures and successes (i.e., adaptive causal attributions) (Perry and Hamm, 2017).

Often a shift in the quality of learner motivation is associated with increased motivation intensity, which in turn predicts performance. For example, intrinsic motivation (i.e., quality) predicts interest, excitement, competence self-perceptions (i.e., intensity) that leads to greater persistence and higher performance (Ryan and Deci, 2000b). Goal orientations affect how learners perceive, experience, and choose learning tasks, behaviours, and strategies (Elliot and Hulleman, 2017). Also, causal attributions determine future effort, persistence, and performance (Perry and Hamm, 2017).

#### **Four Interventions to Enhance Motivation Quality**

To elicit a higher quality of learner motivation, educators should:

- Promote autonomy and structure
- Address learner identity contraindications
- Frame academic challenges as common and improvable
- Elicit a mastery approach to learning goals

See Table 3 for four exemplary interventions under this therapeutic group that can enhance the quality of learner motivation. Other intervention types and examples may be found for balancing authority with accountability (Engle and Conant 2002), re-training how learners interpret academic successes and failures (Weiner, 1985), tactics to increase intrinsic

motivation (Kusurkar et al., 2011a) and establishing an identity for learners within a professional community (Lave and Wenger, 1991).

**Promoting autonomy and structure.** Strategies to promote autonomy and structure influence extrinsic and intrinsic motivation. Extrinsic motivation is when the motive to engage in learning is external to the activity (Ryan and Deci, 2000a). Intrinsic motivation, a higher-quality type of motivation, is when the learner views activities as inherently satisfying, interesting, and enjoyable. It is unrealistic to believe that students will be intrinsically motivated by all learning activities. Educators can provide extrinsic motivators that prompt learners to behave in ways that are similar to learners who are intrinsically motivated (Ryan and Deci, 2000b). Extrinsic motivation occurs on a continuum. At one extreme, the learner is only motivated by the extrinsic reward or avoidance of punishment and sees no inherent value in the activity. At the other end of the continuum, the learner clearly sees the intrinsic value of the activity, but would not otherwise voluntarily initiate the activity in the absence of an extrinsic reward. Offering greater autonomy and choice over learning tasks allows learners the opportunity to shape these activities around their intrinsic interests. (Ryan and Deci, 2000b).

To elicit more autonomous forms of extrinsic motivation, educators should promote learner autonomy while providing structure (Jang et al., 2010). These two instructional styles are not antagonistic (Jang et al., 2010). For example, a clinical supervisor may allow a trainee to choose which patients they would like to follow (i.e., autonomy) and then direct the trainee to resources depending on their choice (i.e., structure). In the classroom, an educator could describe several types (i.e., autonomy) of effective learning strategies that students could apply to learn the material and succeed (i.e., structure). In an online platform, educators could provide step by step directions (i.e., structure) and allow learners' the flexibility to apply these to their own interests (i.e., autonomy).

**Addressing learner identity contradictions.** One of the largest drivers of learner motivation is their evolving identity as a master practitioner (McCaslin and Hickey, 2001, Lave and Wenger, 1991). Learners are continually forming their identity as a future health professional, what it means to be a health professional (e.g., a nurse, pharmacist), and what it means to be a “good” health professional. These self-narrations influence the practices students take up and the decisions they make (Turner et al., 2014).

Contradictions are vital to identity development. There can be contradictions between an education setting and someone’s identity. For instance, if someone believes they are not adept at technology, they may resist online learning. Also, learners may see contradictions between different contexts such as in the classroom and in the clinical setting (Nolen and Ward, 2008). As health professions students ultimately see themselves as future practitioners, they are likely to disregard any school activity they perceive contradicts the norms of practice. In the classroom, it is important for educators to address any contradictions between what they advise and what students may observe in practice. In clinical placements, a clinical supervisor may address contradictions between their setting or specialty and what setting or specialty the learners view themselves as a member. For example, a clinical supervisor in infectious disease may explain to their learners the value of infectious disease knowledge for less specialized practice settings (e.g., primary clinic).

**Framing academic challenges as common and improvable.** Educators should frame academic challenges as common and improvable to elicit a growth mindset (Dweck and Molden, 2017). A growth mindset is when the learner believes, often unconsciously, that greater effort and better strategies will enhance their performance. A fixed mindset, in contrast, is the belief that competence is static and that learners either have the ability to perform well or not. A growth mindset leads to higher quality motivation because learners view effort positively and are willing to use deeper learning strategies (e.g., self-testing)

(Blackwell et al., 2007). Mindsets shape a network of motivational goals and beliefs. See Table 4.

Educators frame academic challenges through their feedback to trainees. They may frame challenges as common by relating to learners' current challenges. For example, they could tell the learner know that they also struggled (e.g., rejection, poor time management, difficulty understanding antibiotics) when they were at the learner's level. Also, challenges can be framed as improvable by providing learners with feedback on how they can improve and letting learners know they are not there "yet."

**Eliciting a mastery approach goal orientation.** Achievement goals are the underlying reasons why learners pursue competence (Elliot and Hulleman, 2017). Achievement goals can be oriented toward approach or avoidance. An approach orientation (i.e., approaching success) is more motivating than an avoidance orientation (i.e., avoiding failure). Approach goals are striving towards a goal such as performing better, improving skills, or attempting to learn, whereas avoidance goals are when students' motive is to prevent looking bad, a decline in their skills, or failure (Elliot et al., 2017). For example, a student with an approach orientation might approach an assignment by saying "I want to get a 90% on this assignment" compared to a student with an avoidance orientation might say "I don't want to get a bad grade on this assignment."

Achievement goals are further separated into mastery and performance orientations. Learners with a strong mastery orientation are typically more motivated to learn. Students create mastery goals to develop their expertise; whereas performance orientation leads to a desire to attain or demonstrate competence relative to a standard (Elliot and Hulleman, 2017). For example, a student may study for a test either because they want to get a good grade (i.e., performance goal) or because they want to become a better physician (i.e., mastery goal).

Educators can elicit a mastery approach goal orientation through the TARGET model (Ames, 1992) and student-focused interventions (Elliot and Hulleman, 2017). See Table 3. One of the most direct ways for educators to elicit a mastery approach orientation is through assessment. Rewards and punishments elicit performance orientations. Opportunities for improvement foster mastery orientations. For example, clinical supervisors can provide trainees ongoing feedback and suggest opportunities to improve framed around developing expertise rather than grades or standards. Likewise, classroom teachers and online modules may create baseline, stepwise, and midpoint assessments that provide formative feedback for improvement.

### **THERAPEUTIC CLASS 3: IMPROVE MOTIVATION KNOW-HOW**

#### **Overview and Theoretical Underpinnings**

Learners regulate their level of motivation by intentionally increasing or sustaining their effort in academic tasks (Wolters, 2003). Motivation know-how relates to learners' beliefs and knowledge of motivation. These may include how important learners believe motivation is for their learning and knowledge of how motivation is increased and sustained. (Wolters and Benzon, 2013). Motivation know-how also includes knowledge of motivational strategies, as well as how, when, and why to use these tactics (Veenman et al., 2006). For example, when motivation wanes, learners may remind themselves why the task is important to them.

By teaching learners motivation “know-how” (i.e., motivation regulation), learners will be better equipped to motivate themselves, persist, and increase their effort (Kistner et al., 2010). When learners actively regulate their motivation, they:

- Create goals for their future behaviour (Boekaerts, 1996)



- Observe their own motivational states, beliefs, and behaviours (Wolters and Benzon, 2013)
- Enact intentionally strategies to increase their motivation quantity and elicit higher quality motivation (Wolters and Benzon, 2013)
- Reflect on their past motivational states, beliefs, and behaviours to adjust future performance (Hadwin et al., 2018)

### **Two Interventions to Improve Motivation Know-How**

Educators can improve motivation know-how by:

- Teaching motivation regulation strategies
- Modelling motivation regulation

See Table 5. Wolters and Benzon (2013) have also studied and outlined different types of strategies that college students use to motivate themselves.

**Teaching motivation regulation strategies.** Using motivation regulation strategies, students purposefully maintain or supplement their willingness to exert effort and complete an instructional task (Wolters and Benzon, 2013, Alexander et al., 1998). These strategies have been classified as environmental structuring, regulation of performance goals, regulation of mastery goals, self-consequating, regulation of value, and regulation of interest (Wolters and Benzon, 2013). Environmental structuring strategies include limiting distractions, changing the setting, and studying at ideal times. Self-consequating includes promising oneself a reward for finishing academic work. Using performance goals, mastery goals, value, and interest, students purposefully engage in reminding, convincing, thinking, and connecting to these goals, values, or interest. For example, a student may purposefully connect the academic material to a future situation in which it would be useful to know the material. In a survey of college students, students most frequently reported environmental structuring strategies and performance goal strategies and less frequently employed task

value, interest, or mastery goal strategies (Wolters and Benzon, 2013).

When learners have difficulty motivating themselves, educators should explicitly discuss motivation strategies including the what, when, why, and how (Veenman et al., 2006, Kistner et al., 2010). For example, classroom educators could post articles or readings highlighting motivation regulation strategies to their online learning management system. Clinical supervisors could instruct learners on how to persist with long-term projects or study (e.g., board exam studying). For example, they may explain to their learners when, why, and how they keep motivated.

**Modelling motivation regulation.** Educators may implicitly foster motivation regulation by modelling the use of motivation regulation strategies (Kistner et al., 2010). Without explicitly mentioning that the educator is using a strategy, an educator's behaviour may lead learners to adopt motivation regulation practices and strategies. For example, a classroom teacher could model the strategy of making tedious aspects of learning more enjoyable through gamification. A clinical supervisor could model their regulation of task value. For example, they might verbalise the costs associated with documenting patient care activities (e.g., time, effort) and how the benefits (e.g., improved teamwork, better data for a future visit) outweigh the costs.

## CONCLUSION

Motivation is key to successful learning. Health professions educators understand the importance of learner motivation; however, many have difficulty designing and delivering instruction that increases motivation. Fortunately, there are evidence-based and field-tested strategies that have been shown to positively influence student motivation. Using a drug compendia metaphor, this guide provides a rationale for and examples of interventions that

Running head: FOSTERING LEARNER MOTIVATION

increase the intensity of learner motivation, increase the quality of learner motivation, and promote learner regulation of their own motivation.

Table 1

*Describing Motivation Theory Using Consumer, Researcher, and Clinician Terminologies*

In layman's terms	Education disciplinary language	Treatment monograph language
What is it?	Guiding principles	Guidelines and interventions
What type is it?	Sets of guiding principles according to learning outcomes	Therapeutic class
For whom and when? What is the intended benefit(s)	Learner subgroups, situations, intended learning outcomes	Indication
Why and how does it produce effects?	Mediating processes	Mechanism of action and pharmacokinetics
How much? What happens if there is too much or too little?	Delivery of teaching and unintended consequences	Dosing and side effects
How can it be delivered?	Design principles, teaching tactics, and design elements	Administration
How do I know it is working?	Assessment and evaluation	Monitoring

Table 2

*Interventions to Increase Motivation Intensity*

Defining Key Terms	Indications	General Administration and Examples	Mechanism of Action	Dosing and Side Effects	Monitoring	Underpinnings / References
<b>Providing Optimal Challenging Learning Tasks</b>						
<i>Optimal challenge</i> - When a learner perceives a task as challenging but not overly difficult	<p><i>For Whom?</i> All learners</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>• Improved competence perceptions</li> <li>• Use of deeper learning strategies</li> <li>• Deeper engagement</li> </ul> <p><i>When?</i> In situations that require deep learning or understanding</p>	<p>Increase task challenge (difficulty and complexity) by using real-world problems and constraints</p> <p>Decrease task challenge by breaking down tasks into pieces, allowing more time, or providing support and hints (e.g., an iterative paper)</p> <p>Continuously calibrate task challenge similar to video games - once learners master an easy level, they continue on to subsequently more difficult levels</p> <p>Predict learners' perceptions of task difficulty by understanding their goals, previous experiences, and capabilities (e.g., conducting a baseline survey or interview)</p>	<p>Learner perceptions of task challenge emerge in each moment, varying across learners and over time.</p> <p>Optimally difficult tasks produce "flow" – a stimulating motivation state and concentration</p>	<p>With easy tasks, learners may experience boredom which limits learning</p> <p>Difficult tasks may be inaccessible for learners, inviting withdrawal, resentment, and short cuts</p>	<p>Observe for deep vs. surface (i.e., going through the motions) engagement</p> <p>Observe for learner emotions – bored (i.e., the task is too easy) vs. overwhelmed (i.e., the task is too hard)</p>	<p>Flow (Csikszentmihalyi 1997)</p> <p>Theories of motivation and self-regulation, interventions to invite motivation and regulation (McCaslin and Hickey 2001; Paris and Turner 1994)</p>
<b>Sparking Curiosity and Interest Among Learners</b>						
<p><i>Curiosity</i> - A natural desire to know more or engage in new situations because they are surprising or new</p> <p><i>Situational Interest</i> - A content- specific state (e.g., I feel interested)</p> <p><i>Personal Interest</i> - Content-specific trait (e.g., I am interested in chemistry)</p>	<p><i>For Whom?</i> All learners, especially those that are not engaged</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>• Increased learner engagement and attention</li> <li>• If supported, sparking situational interest may evolve into personal interests</li> <li>• Increased effort and therefore, performance</li> </ul> <p><i>When?</i> At the beginning of learning and then consistently to develop learners' personal interests</p>	<p>Gamification - Use principles from games including badges, levels, rewards, fail-safe environment, and friendly competition</p> <p>Create novelty and variety: Get novel ideas for teaching by following educators on Twitter, reading blogs, or browsing through education websites</p> <p>Create surprises by incorporating humour, unusual factors, Socratic questioning</p> <p>Stimulate "friendly controversies" by asking learners to vote or debate positions</p> <p>Connect content or activity to learners' current interests</p>	<p>Surprise creates a disequilibrium that learners are curious to explore until they reach equilibrium</p> <p>What is interesting is always intrinsically motivating, but what is intrinsically motivating is not always interesting</p> <p>Interest states decrease cognitive load, allowing learners to take on greater complexity and difficulty</p>	<p>Too much surprise or novelty may lead to feelings of being overwhelmed, inciting learners to disengage</p> <p>"Novelty effect" - Learners are initially interested in novel education elements, but this fades as the novelty effect wears off</p>	<p>Observe for learners' attention or engagement</p> <p>Inventory learners' personal interests</p>	<p>Theories of interest development, interventions to foster interest (Harackiewicz and Knogler, 2018)</p> <p>Educator development on sparking interest (Oyler et al., 2016)</p>

## Running head: FOSTERING LEARNER MOTIVATION

Defining Key Terms	Indications	General Administration and Examples	Mechanism of Action	Dosing and Side Effects	Monitoring	Underpinnings / References
<b>Modelling Enthusiasm and Showing Affective Concern</b>						
<p><i>Modelling</i> - Learners implicitly pick up information through observing others' thinking, actions, process, and the consequences of those actions</p> <p><i>Enthusiasm</i> - An authentic expression of excitement for the topic or activity</p> <p><i>Affective Concern</i> - Learners feel like the educator cares for their well-being and personal development</p>	<p><i>For Whom?</i> All learners, especially those that may not be interested in the content or activity</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>• Higher ratings of educator effectiveness</li> <li>• Related to educator well-being</li> <li>• Increased learner participation, effort, and intrinsic motivation, leading to higher achievement</li> </ul> <p><i>When?</i> At the beginning to spark learners' situational interest and after a difficult task</p>	<p>Enthusiasm for learning and affective concern for the learner should be shown by instructors, near-peers (resident to a student), actual peers, and practicing professionals</p> <p>Share stories of what the material or activity means to you</p> <p>Conclude learning with a preview of what is to come next. This increases interest and demonstrates your enthusiasm to see the learners again.</p> <p>Apply concepts using examples that are either interesting to you or the learners. At times, the educator's enthusiasm may spark a new interest for learners.</p> <p>(Re-)activate your own enthusiasm by thinking about how learners may use the content in the future or what initially engaged you in the topic.</p>	<p>Learners internalize the values and attitudes of those they admire and relate to</p> <p>"Emotional contagion" – The emotions of one person can unconsciously influence others' emotions.</p> <p>Learners perceptions of educators' affective concern for them contributes to learner feelings of belonging</p>	<p>Learners are adept at perceiving when an educator is being inauthentic or authentic.</p> <p>Educators may develop burn-out or negative attitudes if they spend too much energy falsely maintaining enthusiasm. Optimally, learners should share in the responsibility of being enthusiastic.</p> <p>"Distracting details" – Learners may disengage if they do not perceive the examples as relevant.</p>	<p>Learners generally comment on educator enthusiasm in learners evaluations of teaching</p> <p>Observe for learners' attention or engagement</p>	<p>Educator development on enthusiasm (Mitchell, 2013)</p> <p>Interventions to support feelings of belonging (Baumeister and Leary 1995)</p>
<b>Creating Task Relevance and Utility</b>						
<p><i>Relevance</i> - What learners believe is useful to their current personal lives</p> <p><i>Utility</i> - What learners believe will be useful in the future</p>	<p><i>For Whom?</i> All learners</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>• Use of deeper-level learning strategies</li> <li>• Increased engagement and interest in the topic</li> <li>• Influences learners' choice to pursue future opportunities</li> </ul> <p><i>When?</i> In situations where learners may question the value of the material or activity</p>	<p>Eliminate content that is not relevant nor useful for learners</p> <p>Improve the "real world" nature of the tasks and activities (e.g., use real-world problems in class).</p> <p>"Task-value interventions" - Show, don't tell! Show them examples (e.g., news stories, articles) of the relevance or usefulness of the content or activity.</p> <p>"Saying-is-believing effect" - The tendency for learners to believe messages that were freely advocated by the learner. For example, ask the learners, in discussion or in writing, why the content or activity is important to their own lives, others, or the community.</p>	<p>"Exchange value" – Learners constantly evaluate whether and to what extent to participate in an activity based on costs and benefits. For example, only studying material on the exam.</p> <p>Learners determine importance by thinking about the "real world." Is it realistic? Is it aligned with their goals? Is this what they need to know and be able to do?</p>	<p>If everything is labelled as important, then nothing becomes important</p> <p>If learners don't think content or activity is relevant or useful, they will go through the motions (i.e., surface-level engagement)</p>	<p>Observe whether learners are going through the motions or going above and beyond (i.e., their level of engagement)</p> <p>Inventory what learners perceive as relevant and useful</p>	<p>Expectancy-value-cost theory, interventions to improve task value (Renninger and Hidi 2011; Harackiewicz and Priniski, 2018)</p> <p>Communities of Practice theory (Lave and Wenger 1991)</p>

Table 3

*Interventions to Enhance Motivation Quality*

Defining Key Terms	Indications	General Administration and Examples	Mechanism of Action	Dosing and Side Effects	Monitoring	Underpinnings / References
<b>Promoting Autonomy and Structure</b>						
<p><i>Autonomy</i> - When learners wholeheartedly endorse their own actions. The opposite is controlling</p> <p><i>Structure</i> - Providing clear information to learners about expectations and how to achieve learning outcomes. The opposite is chaos and confusion.</p>	<p><i>For Whom?</i> All learners</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>• Intrinsic motivation</li> <li>• Self-reported and observed engagement</li> </ul> <p><i>When?</i> As often as possible</p>	<p>Provide learners with choices</p> <p>Nurture learners personal interests and responsibility for their own learning</p> <p>Direct learners with “can,” “may,” and “I invite you to” rather than “must,” “need,” and “should.”</p> <p>Explain to learners what it takes to reach the desired outcomes</p> <p>Provide consistent step-by-step directions and smooth transitions</p>	<p>When autonomy and structure are both provided, the basic human needs to feel autonomous and competent are supported</p> <p><i>Autonomy Support</i> Activates learner interest, goals, curiosity, and sense of challenge. Learners will see their successes as earned by them and experience their own free will, resulting in intrinsic motivation.</p> <p><i>Structure Support</i> Learners feel greater control over academic challenges (i.e., internal locus of control), resulting in greater confidence (i.e., self-efficacy)</p>	<p>Too much autonomy may require more educator oversight, coordination, and grading</p> <p>Too little autonomy may lead learners to feel controlled and dependent, leading to frustration, boredom, and defensiveness</p> <p>Too much structure may lead to boredom and reliance on structure</p> <p>Too little structure leads to being overwhelmed, confused, or lost which may lead to taking short cuts and use of surface learning strategies.</p>	<p>Observe or have learners report on their level of engagement</p> <p>Observe for mediating processes—frustration, boredom, and surface learning strategies</p>	<p>Self-determination theory, interventions for supporting autonomy and competence (Ryan and Moller, 2018; Jang, Deci, Reeve, 2010)</p>

## Running head: FOSTERING LEARNER MOTIVATION

Defining Key Terms	Indications	General Administration and Examples	Mechanism of Action	Dosing and Side Effects	Monitoring	Underpinnings / References
<b>Addressing Learner Identity Contradictions</b>						
<p><i>Identity contradictions</i> - Misalignments between one's identity and an activity. Also, contradictions between different contexts such as the classroom and clinical practice</p>	<p><i>For Whom?</i> Learners who hold an identity that contradicts with the content area or learning environment (e.g., a learner who does not identify with a specialty)</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>• Learner choices</li> <li>• Deeper engagement</li> <li>• Intrinsic motivation</li> </ul> <p><i>When?</i> In situations that lead to identity contradictions</p>	<p>Bring in a speaker that learners identify with currently (near peer) or in the future (practicing professional). Have the speaker discuss the value of the activity</p> <p>Create a hybrid across the two contradictions (e.g., having school-based faculty visit clerkships, having clinicians co-teach certain topics)</p> <p>Address learners misconceptions that they internalized from previous experiences, popular culture, and their social network (e.g., through a class discussion)</p>	<p>A deep motive of learners is becoming a part of a community of practice (e.g., hospital, clinic). This drives their participation and choices in activities, formulating their identity</p> <p>When a topic or activity contradicts a learners current identity, they will complete the least amount of work as possible. However, this mechanism can be overruled by appealing to learners' future identities, especially their identity to be a "good" health professional.</p>	<p>If a learner believes the educator is overinflating the importance of a topic, they may lose trust in the educator.</p> <p>If a learner believes the educator is telling them what to do or how to be, they may become defensive</p>	<p>Observing for surface versus deep engagement</p> <p>Ask learners what they do not enjoy or value about the task - it might unearth identity contradictions</p>	<p>Situative motivation (Nolen et al., 2015)</p> <p>Communities of Practice Theory (Lave and Wenger, 1991)</p> <p>Motivational Filters (Horn and Campbell, 2015)</p>
<b>Framing Academic Challenges as Common and Improvable</b>						
<p><i>Academic challenges</i> - Events that learners interpret as challenging or failure (e.g., low marks, critical feedback)</p>	<p><i>For Whom?</i></p> <ul style="list-style-type: none"> <li>• Those who may lack successful models (e.g., first-generation University students, under-represented identities)</li> <li>• Low performers who endorse a fixed theory of intelligence (i.e., fixed mindset)</li> </ul> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>• Malleable theory of intelligence (i.e., growth mindset)</li> <li>• Increase feelings of belonging, leading to more intrinsic motivation</li> <li>• Increased marks and persistence</li> <li>• Decreased attrition</li> </ul> <p><i>When?</i> During tough transitions or first perceived failures</p>	<p>"Framing interventions"</p> <ul style="list-style-type: none"> <li>• Frame challenges as common and improvable (e.g., provide statistics or quotes from more senior learners illustrating that challenges to adjusting to the learning environment are common and can be overcome)</li> <li>• Share your personal stories of overcoming challenges in academia or practice</li> <li>• Have learners write about (or discuss) how to overcome academic challenges</li> </ul> <p>"Mindset interventions"</p> <p>Share and assign reading materials framing intelligence as malleable</p>	<p>Some learners will interpret challenges or failure as evidence that they lack intelligence, don't belong in an area, or are "just not a certain type of person" (e.g., critical care person)</p> <p>Framing challenges as common supports learner belief that they belong even though they failed.</p> <p>Framing challenges as improvable supports the belief that they can achieve but require more effort and better strategies</p>	<p>If the interventions are not provided during a period of transition or challenge, the interventions may be seen as another academic exercise</p>	<p>Listen to how learners discuss their challenges or failures. Do they see them as permanent or improvable? Common or unique to them?</p> <p>Inventory learners implicit theories of intelligence (i.e., mindsets)</p>	<p>Interventions to support feelings of belonging and relatedness (Jang, Deci, Reeve, 2010; Baumeister and Leary, 1995)</p> <p>Growth mindset interventions (Harackiewicz and Priniski, 2018)</p>



Defining Key Terms	Indications	General Administration and Examples	Mechanism of Action	Dosing and Side Effects	Monitoring	Underpinnings / References
<b>Eliciting a Mastery Approach Goal Orientation</b>						
<p><i>Mastery approach goal orientation</i> - The underlying reason or goal for learning is to further master a task or develop competence</p> <p><i>Performance goal orientation</i> - The underlying reason or goal for learning is to outperform their peers (e.g., good marks, higher reputation)</p>	<p><i>For Whom?</i> All learners</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>• Elicits a mastery approach goal orientation</li> <li>• Increased self-efficacy and interest</li> <li>• Improved marks</li> <li>• Decreased anxiety and failure avoidance</li> </ul> <p><i>When?</i> In situations where a mastery approach goal orientation is required for complex, long-term learning</p>	<p>The TARGET model for classroom structure</p> <ul style="list-style-type: none"> <li>• Tasks: Optimally challenging, interesting</li> <li>• Authority: Learners participate in decisions</li> <li>• Recognition: In a private setting</li> <li>• Grouping of learners: Mixed-ability</li> <li>• Evaluation: Based on self-improvement</li> <li>• Time: Flexible</li> </ul> <p>"Student-focused" interventions</p> <ul style="list-style-type: none"> <li>• Reframe assessments as an opportunity to learn</li> <li>• Define goal orientations and have learners discuss the advantages of a mastery orientation</li> <li>• Teach deeper learning strategies (e.g., self-testing, explaining topics to others)</li> </ul>	<p>Learners may have both a mastery and performance orientation</p> <p>Learners may have a performance orientation in one unit and a mastery orientation in another</p> <p>Learners underlying reason(s) for learning (i.e., orientation) leads to different patterns of behaviour.</p> <p>Mastery orientation leads to the use of deeper learning strategies, deep engagement, and seeing challenges as motivating.</p>	<p>Too much mastery without performance: Learners may lack the strategy or spend too much time on interesting material to attain higher performance</p> <p>Too much performance without mastery: Learners may take short cuts or do the bare minimum, therefore decreasing their long-term learning needed to succeed in the future</p> <p>If instruction on mastery goals is perceived by learners as only advising them to "try harder," they may feel defensive that the educator does not understand how hard they are trying</p>	<p>Have learners take a goal orientation inventory</p> <p>Observe for expressions of their orientation (e.g., deep vs. surface level learning strategies)</p>	<p>Achievement goal orientation interventions (Ames, 1992; Elliot and Hulleman, 2017)</p>

Table 4

*How Mindsets Lead to a Network of Beliefs, Goals, and Attributions (adapted from Dweck & Molden, 2017)*

Belief or goal type	Higher Quality Network	Lower Quality Network
Mindset	Growth mindset	Fixed mindset
Views on effort	Seen to positively affect learning	Seen to reflect a negative ability
Achievement goal orientation	Mastery goal orientation	Performance goal orientation
Causal attributions	Failures are seen as a reflection of effort and strategy	Failures are seen as a reflection of their static ability
Reaction to setbacks	Work harder and try different strategies	Spend less effort and avoidance

Table 5

*Interventions to Improve Motivation Know-How*

Defining Key Terms	Indications	General Administration and Examples	Mechanism of Action	Dosing and Side Effects	Monitoring	Underpinnings / References
<b>Instructing on Motivation Regulation Strategies</b>						
<p><i>Motivation regulation strategies</i> - Techniques that learners use to motivate themselves, especially when their attention, interest, and excitement are waning.</p>	<p><i>For Whom?</i> Learners who may lack the knowledge of strategies on how to motivate themselves</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>Increased knowledge and understanding of motivation regulation strategies</li> </ul> <p><i>When?</i> In situations where learners experience difficult tasks, transitions, or learning environments</p>	<p>Examples of motivation regulation strategies: Creating a quiet environment, self-talk, creating rewards, making it a game, recruiting an accountability buddy, and reconnecting to your internal motives</p> <p>Instruct on motivation regulation strategies through facilitated discussions, think-pair-shares, mini-lectures, and reading materials</p>	<p>One reason a learner may not be motivated is they lack the knowledge of strategies for how to motivate themselves. Since it is difficult to motivate oneself, learners may require direct instruction on how to motivate oneself.</p>	<p>If a learner already knows how to motivate themselves, but does not value the task, then this will be a misguided effort</p> <p>Best to incorporate within the task at a point when the learners are struggling to motivate themselves</p>	<p>Asking learners what strategies they use to motivate themselves and then evaluating the effectiveness of those strategies</p>	<p>Interventions to instruct self-regulated learning (Zepeda et al., 2015)</p>
<b>Modelling Motivation Regulation</b>						
<p><i>Motivation regulation modelling</i>- Techniques that educators use to demonstrate how they influence their personal motivation especially when their attention, interest, and excitement are waning</p>	<p><i>For Whom?</i> Learners who may lack the knowledge of strategies on how to motivate themselves</p> <p><i>Outcomes:</i></p> <ul style="list-style-type: none"> <li>Increased knowledge of motivation regulation processes</li> </ul> <p><i>When?</i> In situations where learners experience difficult tasks, transitions, or learning environments</p>	<p>Share stories with learners about how you motivate yourself when your motivation is waning (i.e., modelling for learners).</p> <p>Think-aloud as you face an obstacle that could inhibit your motivation.</p> <p>When asking learners to set goals, identify strategies, or reflect on their motivation processes, start with your own answers and experience.</p>	<p>When educators model their own regulation, learners are more likely to understand their use and begin to use them on their own.</p>	<p>There can never be too much modelling. However, learners don't always pick up on what educators are modelling without clear cues (e.g, holding a sign or using a consistent phrase to signpost this).</p>	<p>Asking learners who their models are for motivating themselves</p>	<p>Interventions to instruct self-regulated learning (Zumbrunn et al., 2011)</p>

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