Designing for Learning Cards

A Synthesis of Key Insights from the Science of Learning and Development

©Transcend, Inc. 2019
About Transcend

Transcend is a national nonprofit organization focused on innovation in school design. We support communities in creating and spreading extraordinary, equitable learning environments.

To learn more about working with Transcend, reach out to us at explore@transcendeducation.org.
Authors
Jennifer Charlot, Transcend Partner, Build Knowledge
Cynthia Leck, Transcend Partner, Build Knowledge
Bror Saxberg, Transcend Board Member and VP, Learning Science at the Chan Zuckerberg Initiative

Acknowledgments
Thank you to the following people and organizations, who contributed heavily to this resource by providing thoughtful inspiration and feedback along the way.

Researchers Advisory Group
Pooja Agarwal, RetrievalPractice.org
Ulrich Boser, Center for American Progress
Sheldon Horowitz, National Center for Learning Disabilities
Lisa Quay, Mindset Scholars Network
Benjamin Riley, Deans for Impact
Gabrielle Schlichtmann, Harvard Graduate School of Education
Brooke Stafford-Brizard, Chan Zuckerberg Initiative
Ahna Suleiman, Center for the Developing Child, University of California, Berkeley
Jessica Tsang, Chan Zuckerberg Initiative
Melina Uncapher, Neuroscape, University of California, San Francisco

2017–2018 NewSchools + Transcend Collaborative Cohort
Bard High School Early College
The Brooklyn STEAM Center
Catholic Schools in the Archdiocese of New York
Chicago International Charter School
Collegiate Academies
Edgecombe County Public Schools
Ednovate
Education Leaders of Color
San Marcos Consolidated Independent School District
Strive Preparatory Schools

Transcend Team
Every member of our team contributed to this resource at some point along the journey. Thank you. Your ideas, encouragement, and assistance made this a more impactful resource. And a special thanks to Kate Coxon who undertook the initial research and writing for this project.
Welcome Designers

At Transcend, we support our school partners in using insights from many contexts to provoke thinking and inspire design. These contexts include their local community, the larger field of education, and the world beyond. The insights shared in our *Designing for Learning Cards* come from cognitive science, neuroscience, and psychology, among other disciplines. Each card highlights key research findings related to how learning happens and the implications for learning environments.

These cards supplement our *Designing for Learning Primer: A Synthesis of Key Insights from the Science of Learning and Development* and are meant to help you apply the ideas in that longer resource. If you have not yet explored that resource, please do so before working with these cards. It will help you gain a deeper understanding of how different factors—specifically cognition, motivation, identity, and individual variability—influence learning.
Assembling the Cards

On the pages that follow you’ll find 16 cards. Each one has a front and a back. The front contains one of the learning principles from the Designing for Learning Primer. The back contains the implications for learning environment, phrased as questions to inspire design and reflection. In order to assemble the cards you’ll need to print them, cut them out, and finally do some folding and taping. You’ll see a dashed line and a scissors symbol (        ) where you should cut. You’ll see a solid line and a paper folding symbol (         ) where you should fold.

Engaging in Activities

There are many ways to use these cards. We’ve included two examples. The first focuses on brainstorming different ways elements of a learning environment can be designed to support learning. The second involves analyzing a learning environment—whether your own current environment, one you are designing, or one you’re inspired by—to determine if it honors how learning happens. As you engage in these activities, keep in mind that while each of the principles discussed in the resource has critical implications for the design of learning environments everywhere, the specific decisions a community makes in order to honor them will likely be deeply contextual. To ensure the context is well represented, we encourage you to include kids, families, and others beyond the direct design team in these activities. In addition, while we encourage you to take this work on in pieces we also believe it’s essential to account for all 16 principles shared in this resources. In other words, creating a design that overdials on one factor—for example by only accounting for the cognitive principles of learning—neglects a great deal of what’s known about how learning happens. As a result, the model is not as likely to achieve great results for kids.
Feedback, Card Orders, & Additional Resources

After using the Designing for Learning Cards, we’d love your feedback. You can scan the QR code below with your phone’s camera or go to http://bit.ly/d4lsurvey to take a short survey.

You can also use this code to order professionally-printed card packs and access additional resources. Professionally-printed packs contain additional activities to help building understanding of how learning happens, as well as apply this understanding to analyzing and designing learning environments. Each pack also includes a booklet with a short overview of the Designing for Learning Primer.
Designing with a Whole-School Perspective

While the insights shared on these cards have many classroom and instructional implications, we believe achieving truly outstanding and equitable results will require every element of the traditional school model to be rethought. At Transcend, we use the framework below to help think about the various “system elements” that must be designed and built in alignment to achieve a whole-school design. As you use the cards in this resource, we encourage you to work with this perspective in mind and not only design for instruction, but design for every element of your new, or redesigned, learning environment.

- **Curriculum, Instruction & Assessment**: The content young people learn and how they learn it, as well as how they demonstrate their learning and progress toward new goals.
- **School Community & Culture**: The makeup, rituals, and community practices of the entire learning environment.
- **Adult Roles, Hiring & Development**: The roles adults play; the knowledge, skill, mindset, and experience profiles those roles demand; and resources that support how adults communicate, interact, and develop.
- **Scheduling & Use of Time**: How learners and adults move through time—when they arrive and leave, how long they spend engaged in different experiences, and how this varies by individual.
- **Community & Family Partnerships**: How learners and staff interact with families and the broader world outside the immediate learning community.
Space & Facilities
The design and organization of the physical space where learning occurs.

Technology & Tech Infrastructure
The hardware, software, and connective infrastructure used to support communication and learning.

Communications
How the work of the school is shared externally with families, the local community, and the larger field of education in order to ensure understanding and garner support.

Budget & Operations
How budgets are allocated, as well as operational dimensions such as transportation, nutrition, and meal systems.

Continuous Learning & Improvement
How everyone in the learning community understands success and progress, learns and reflects together, and influences the evolving model.
Cognition

**Focused Attention**

People learn best when they direct their focus toward the content and experiences most relevant to learning.

How might we design learning environments to:
- Help learners feel physically and psychologically safe and healthy?
- Ensure that learning objectives and activities are clear?
- Minimize sensory distractions?
- Provide consistency?

Cognition

**Meaningful Encoding**

People learn best when new learning is experienced in memorable ways and is related to prior knowledge.

How might we design learning environments to:
- Promote distinctive or emotionally compelling learning experiences?
- Connect new learning to learners’ prior knowledge and experiences?
- Help learners make underlying factual and conceptual connections?
- Integrate multiple representations of content through different modalities, problem types, and contexts?

Cognition

**Manageable Cognitive Load**

People learn best when they are challenged but are processing a manageable amount in their working memory.

How might we design learning environments to:
- Minimize cognitive and emotional distractions?
- Break learning into manageable, logically sequenced increments?
- Represent content and experiences clearly?
- Respond to individual learner readiness with tailored supports and pacing?
- Ensure that individual learners achieve competency with prerequisite objectives before they move on?

Cognition

**Effective Practice**

People learn best when they practice challenging-but-doable skills at frequent, focused intervals and across diverse contexts.

How might we design learning environments to:
- Use each learner’s current proficiency to plan opportunities for practice?
- Provide learners with ongoing opportunities to engage in focused, frequent practice, across diverse contexts?
- Build learners’ own understanding of effective practice?
Cognition
High-Quality Feedback
People learn best when they direct their focus toward the content and experiences most relevant to learning.

How might we design learning environments to:
• Build learners’ understanding of what success looks like?
• Offer sufficient, timely opportunities for giving and receiving feedback so that learners can improve?
• Ensure feedback provides a sufficient and accurate analysis of a learner’s progress as well as guidance for improvement?

Motivation
Value
People learn best when they direct their focus toward the content and experiences most relevant to learning.

How might we design learning environments to:
• Ensure that what is being learned feels relevant to the interests and goals of all learners?
• Ensure how learning occurs feels compelling to learners?
• Enable learners to work with peers and adults with whom they have meaningful relationships?
• Use extrinsic rewards only sparingly and support progress toward intrinsically motivating goals?

How might we design learning environments to:
• Make the skills and mindsets that support metacognitive thinking explicit learning objectives?
• Help learners understand how different beliefs and messages may be impacting their thinking?
• Ensure opportunities for learners to apply metacognitive thinking strategies across all learning contexts?
• Develop a culture in which thinking about one’s thinking is the norm?

How might we design learning environments to:
• Engage learners in tasks that are challenging but doable?
• Help learners set goals, plan toward them, and reflect on their progress?
• Frame failure as a temporary state that can be changed by changing one’s behavior?
• Ensure that learners have trusted adults from whom they can seek help when they feel insecure about their abilities?
<table>
<thead>
<tr>
<th>Motivation</th>
<th>Sense of Control</th>
<th>How might we design learning environments to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>People learn best when they direct their focus toward the content and experiences most relevant to learning.</td>
<td>- Provide appropriate autonomy over when, where, or how learning is pursued?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Help learners attain the supports and resources needed to achieve their goals?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Minimize external barriers to learning?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identity</th>
<th>Self-Understanding</th>
<th>How might we design learning environments to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>People learn best when they direct their focus toward the content and experiences most relevant to learning.</td>
<td>- Deepen learners' understanding of their life story, heritage, and community?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Help learners identify and reflect on their strengths and areas for growth?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Immerse learners in new contexts and activities?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Offer opportunities for learners to express their various changing identities?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Help learners reflect on their current identities, desired future identities, and how best to bridge the two?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Constructive Emotions</th>
<th>How might we design learning environments to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>People learn best when they direct their focus toward the content and experiences most relevant to learning.</td>
<td>- Be warm and joyful spaces?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Foster positive relationships between peers, as well as between adults and learners?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Support physical and psychological health and well-being?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Help learners diffuse negative emotional states?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identity</th>
<th>Sense of Belonging</th>
<th>How might we design learning environments to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>People learn best when they direct their focus toward the content and experiences most relevant to learning.</td>
<td>- Be relevant to and celebrate learner's identities?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Provide all learners with opportunities to be heard and encourage participation?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Hold high expectations for all learners?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Help learners understand that self-doubt happens to everyone?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Minimize zero-tolerance and utilize restorative practices to re-establish trust and connectedness?</td>
<td></td>
</tr>
</tbody>
</table>
Identity
Navigating Identity Threats
People learn best when they direct their focus toward the content and experiences most relevant to learning.

Individual Variability
Developmental State
People learn best when they direct their focus toward the content and experiences most relevant to learning.

Individual Variability
Life Experiences
People learn best when they direct their focus toward the content and experiences most relevant to learning.

Individual Variability
Learning Differences
People learn best when they direct their focus toward the content and experiences most relevant to learning.

How might we design learning environments to:

- Cue learners’ motivating identities over identities that may trigger stereotypes or self-doubt?
- Minimize actions, words, or images that may trigger negative self-perceptions?
- Expose learners to individuals who have countered identity threats?
- Help learners understand and act against systemic inequity and personal experiences of bias?

How might we design learning environments to:

- Understand the privileges and adversities that each learner carries?
- Ensure that each learner is supported by a caring adult?
- Use trauma-informed practices?
- Provide or connect learners and families with non-academic resources and supports?
- Leverage assets in learners’ home and community contexts to support learning?

How might we design learning environments to:

- Support key developmental tasks that occur across different phases of life?
- Respond flexibly to reach all learners at their own developmental zones physically, cognitively, socially, and emotionally?
- Support learners in understanding and responding to their own development?

How might we design learning environments to:

- Ensure individual learners’ needs and strengths are understood by adults and learners themselves?
- Respond to differences by enabling learners to take in, engage with, and demonstrate learning in different ways?
- Provide tailored scaffolds and supports in response to specific needs?
- Maintain high standards for all learners, no matter their needs?
Activity 1: Generating New Design Ideas

This activity will help you quickly develop new design ideas that honor research on learning. It involves using the “How might we...?” questions on the back of each card to provoke thinking and generate ideas related to various elements of a learning environment's design. The variations on the next page also show 1) a more structured way to generate expansive ideas and 2) a way to think about design decisions you want to avoid.

General Steps

1. Review the content. Everyone involved in this activity should be familiar with the ideas in the Designing for Learning Primer before getting started.

2. Select principles. Determine which principles you want to focus on. Don’t try to take them all on at once. For example, consider starting with the principles associated with just one factor, such as identity.

3. Brainstorm ideas. Engage in rapid, generative brainstorming—don’t worry about whether ideas overlap, seem too big or too small, or feel hard to implement. To do this, use the “How might we design learning environments that...?” questions associated with each principle to spur your thinking. For example, ask yourself, “How might we design learning environments that help learners feel physically and psychologically safe and healthy?” To generate ideas quickly and allow for flexibility later, try using a sticky note for each idea and placing them on different pieces of chart paper for each principle you decided to focus on.

4. Review and refine. Go back through your list of ideas and refine them by collapsing similar ideas together and adding more details. If you used sticky notes and chart paper you can physically move the stickies into groups, circle these groups, and label them.

The graphic above show what steps 3 and 4 might look like if you’re using chart paper and sticky notes.
Variation 1: Use System Elements to Expand Thinking

As mentioned in the introduction of this resource, successfully designing a learning environment requires the alignment of many resources, systems, and structures. As a variation on the general steps for this activity, think about how you might design each of the “system elements,” on page 3, in support of the principles you’re focused on. Try using a template like the one depicted below to do this.

<table>
<thead>
<tr>
<th>System Element</th>
<th>Design Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum, Instructions &amp; Assessment</td>
<td></td>
</tr>
<tr>
<td>School Community &amp; Culture</td>
<td></td>
</tr>
<tr>
<td>Adult Roles, Hiring &amp; Development</td>
<td></td>
</tr>
<tr>
<td>Scheduling &amp; Use of Time</td>
<td></td>
</tr>
<tr>
<td>Community &amp; Family Partnerships</td>
<td></td>
</tr>
<tr>
<td>Space &amp; Facilities</td>
<td></td>
</tr>
<tr>
<td>Technology &amp; Tech Infrastructure</td>
<td></td>
</tr>
<tr>
<td>Budget &amp; Operations</td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>Continuous Learning &amp; Improvement</td>
<td></td>
</tr>
</tbody>
</table>

Variation 2: Brainstorming Design Decisions that Violate Research

There are many ways that learner environment may violate the principles related to how learning happens. Brainstorming these violations can be eye-opening. As a variation on the general steps for this activity, try brainstorming using the question stem, “How might some learning environments NOT...?“ When you’re done, step back and consider if any of these design decision describe your current model or traditional school models in general.
Activity 2: Auditing Your Learning Environment

This activity will help determine the extent to which your current learning environment aligns to the research on how learning happens. It involves determining whether the environment honors, violates, or is neutral on each of the principles related to cognition, motivation, identity, and individual variability. The variations on the next page also show how additional perspectives can be brought into this process and how you can use observations.

General Steps

1. Review the content. Everyone involved in the audit should be familiar with the principles you’ll be auditing for and the related implications for design before getting started.

2. Select principles. Determine which principles you want to focus on. Don’t try to take them all on at once. For example, consider starting with the principles associated with just one factor, such as identity.

3. Conduct your audit. One by one consider each principle you’ve chosen to focus on and the extent to which your environment honors, violates, or is neutral on the principle. Then, place the associated card on a spectrum with honors at one end, violates on the other, and neutral in the center. As you go, jot down evidence for your assessment somewhere—this is critical!

4. Act on your audit: Now it’s time to adjust your design! Go principle by principle—focusing your attention on those in the neutral or violates end of the spectrum—and think about changes you could make to the design of the environment to further honor how learning happens. Use the questions on the back of each card to spur thinking.

The graphic above shows what your audit process will look like after step 3.
Variation 1: Inviting in Different Perspectives

The general steps for this activity ask you to audit your current learning environment based on what you already know about it. However, often times you'll be missing some information. This is because your perspective on the environment is only one of many. For example, what would learners say about your environment’s alignment to research? In order to find out, engage in one of the following:

- **Include stakeholders beyond the design team in the audit.** Engaging learners, family members, community members, or other staff members beyond your design team in the audit process is a great way to bring in different perspectives and get a more complete picture!

- **Conduct interviews to deepen understanding of other perspectives.** You can also learn from others through interviews and then use this information in your audit. If you plan to do this, use the backs of the design cards to help you generate questions. For example, “Tell me a bit about the extent to which you feel safe and secure in our school and why?”

Variation 2: Observing for Alignment

Another way to broaden your perspective is to go observe. This will prevent you from relying just on what you remember, which might be clouded by personal feeling or be out-of-date. Also, this approach allows you to narrow your focus and think more deeply about one part of a learner’s experience. For example, you could drop into the same space a few times over the course of a week, observe and take notes, and then use these notes in an audit. Be creative about the spaces you observe as well—don’t limit yourself to classrooms. Why not go observe the lunch space, recess, an adult professional development space, or the front entry way in the morning? This will help to highlight concrete examples of different principles in action. Later, as you audit, also remember to go deeper than just what you observed and ask: What policies, rules, elements of culture, etc. influenced how well this principle was enacted?

Variation 3 Audit an Environment that Inspires You

You can learn a lot from auditing learning environments other than your own too! So, try adding a variation on the general steps by focusing on a learning environment that you’re inspired by and want to learn from. You can do this by observing the environment in action in the ways described in Variation 2. You can also do this by reading about the learning environment or watching videos. You could even do interviews with member of the community. Once you've collecting information, complete your audit. Then, consider how these learnings might inspire you to make changes in your own environment.