Competencies in the Revised Workforce Framework for Cybersecurity (NICE Framework)

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Why a Workforce Framework for Cybersecurity?
A consistent framework model...

- Enables the establishment of **regular processes** – from hiring to training and assessment – for multiple roles in an organization.

- Shares **clear information about cybersecurity work** to help students interested in this career field, people looking for a new job or to change job roles, and workers who are looking to demonstrate or increase their competencies.

- Provides direct information about **what a workforce needs to know**, helping in the development of certificates, badging, and other verification techniques to consistently describe learner capabilities.
NICE Framework Revision
Revision Changes

• Introduction of Competencies
• Removed:
  – Specialty Areas (reflected in Competencies, Roles)
  – Ability Statements (incorporated in Skill statements)
• Appendices: Moved outside the publication

nist.gov/nice/framework
NICE Framework Attributes

- Agility
- Flexibility
- Interoperability
- Modularity
Why Competencies?
America’s *private employers have modernized their recruitment practices* to better identify and secure talent through skills- and competency-based hiring.

... 

Modernizing our country’s processes for identifying and hiring talent will provide America a *more inclusive and demand-driven* labor force ... ensuring that the individuals *most capable of performing the roles and responsibilities* required of a specific position are those hired for that position.
Building Blocks: Tasks, Knowledge, and Skills (TKS)

- Task
  - Describes the Work
- Skill
- Knowledge
  - Describes the Learner
Applications and Uses
What is a Competency?
**What are Competencies?**

**Competency: A mechanism for organizations to assess learners.** Competencies consist of a name, description of the Competency, and group of associated TKS (Task, Knowledge, Skill) statements.

**Competencies are**
- Defined via an employer-driven approach
- Learner-focused
- Observable and measurable
But how can I use them?

• **Employers**
  – Describe needed expertise within a given position
  – Track workforce capabilities
  – Specify team requirements
  – Assess learner capabilities

Assessment examples:
• Interview
• Pre-employment testing
• Work-based learning observation
• Lab-based demonstration
• Oral evaluation

Ex.: Using Competencies to Assess Learners through a Position Description
But how can I use them?

- **Education/Training Providers**
  - Instructors might look at the most frequent K&S reflected in a competency to focus on teaching those.
  - Providers might use tasks in a competency to test whether learners have achieved the K&S in that area.
  - Providers might use a set of competencies to develop a learning program.

Ex.: Using Competencies to Assess Learners through a Credential

Can be applied in parts or as a whole
- Knowledge & Skills
- Tasks
- Competency
- Multiple Competencies
But how can I use them?

- **Learners**
  - To assess one’s abilities
  - To identify areas that may need development
  - To learn about a defined area of expertise
  - To understand an organization’s workforce needs

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**At multiple stages:**
- Initial Interest
- Students
- Job-seekers
- Career Development

Ex.: Assessing One’s Abilities
Next Steps

• **2021 Change Plan**
  Review and updates to align with revision; for final release November 2021
  – Competencies (including Specialty Areas) – *expected January 2021*
  – Work Roles (including Specialty Areas)
  – Skill Statements (including Ability Statements)
  – Knowledge Statements
  – Task Statements
  – Categories

• **2021-2022: Ongoing Change Process**
  – Additions, adjustments
  – Earlier content will still be available
  – New supporting resources
December 2020/
January 2021
Launch of NICE
Framework
Users Group
NICE Framework Resource Center
nist.gov/nice/framework

NICE Framework Publication
Revised, streamlined document

NICE Framework Data
Tasks, Knowledge, Skills, and Work Roles (formerly appendices) continue to be available at the NICE Framework Resource Center; Competencies to join soon.

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THANK YOU!
Q & A
USING COMPETENCY-BASED APPROACHES TO CLOSE THE CYBERSECURITY SKILLS GAP
Competency Defined

Skills & Abilities

What do I need to know? What theories or ideas?

What do I need to be able to do?

What dispositions must I display?

Application & Transfer

Where must I be able to apply these KSAs, and at what level?

Understands the theory of XXX, and has the skills and dispositions to successfully apply all of these at the beginning level in XXX situation.

Focus on what’s needed to be successful - outcomes.
What is CBE?

• Competency-based education (CBE) is focused on actual student learning, and the application of that learning, rather than time spent in class/on material.

• Learners’ progress is measured when they demonstrate their competence through a system of rigorous assessments, meaning they prove they have mastered the knowledge and skills, required for a particular competency or area of study.
Competency-Based Approaches

Competency-Based Learning
- Courses or modules offered by IHEs
- Prior Learning Assessment
- Military credit
- Other work-based learning
- Apprenticeships
- Industry certifications
- Government licensures

Competency-Based Education
- Direct assessment credential programs
- Course-based, credit-hour CBE credential programs
C-BEN Resources

Quality Framework for Competency-Based Education Programs

Eight Elements of Quality

1. Demonstrated Institutional Commitment to and Capacity for CBE Innovation
2. Clear, Measurable, Meaningful and Integrated Competencies
3. Coherent Program and Curriculum Design
4. Credential-level Assessment Strategy with Robust Implementation
5. Intentionally Designed and Engaged Learner Experience
6. Collaborative Engagement with External Partners
7. Transparency of Student Learning
8. Evidence-driven Continuous Improvement
C-BEN’s Priorities and Work

- Grow Demand
- Build Capacity
- Remove Barriers
Here to Help Others Transition to CBE

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Q & A
Building a Dynamic Skills Organisation

Brian Kropp
Vice President and Chief of Human Resource Research

16th December 2020
One-Two Punch: More Skills and New Skills

Average Skills Required per Job Posting
IT, Finance and Sales Roles in U.S.

Rising Demand for More Skills
The total number of skills required for a single job is increasing by 10% year-over-year.

New Skills Displacing Old Skills
33% of the skills that were present in an average job posting in 2017 will not be needed by 2021.

2017 Skills: 12.6
2018 Skills: 11.5
2019 Skills: 10.5
2020 Skills: 9.5
2021 Skills: 8.4

n = 13,166,410 (2019); 12,008,840 (2018); 9,991,265 (2017) job postings
Source: Gartner TalentNeuron
HR Reacting to Skill Changes

Q: “We Are Constantly Trying to Keep Up With the Learning Requests of the Business.”

Percentage of HR Executives

59% Agree

41% Disagree

n = 75 HR executives
Source: 2020 Gartner Shifting Skills Survey for HR Executives

Q: “Our HR Function Addresses Skill Needs When Asked by the Business.”

Percentage of HR Executives

63% Agree

37% Disagree

n = 75 HR executives
Source: 2020 Gartner Shifting Skills Survey for HR Executives

“There are many more requests for learning, and we don’t have the resources or staff to address them all. ... and when we put together a learning solution, the business has already moved on.”

Head of Learning and Development, Manufacturing Organization
Reactive Approach Fails to Keep Up

New Skills Applied Over Time, by Skill Approach

Average Percentage of New Skills Applied

A reactive skills approach results in employees only applying 54% of the new skills they learn. A reactive approach is primarily focused on adjusting skill strategies based on needs requested by the business.

n = 6,510 employees; 75 HR executives; 35,166,515 job postings for IT, Finance and Sales in U.S.
Source: 2020 Shifting Skills Survey for Employees; 2020 Shifting Skills Survey for HR Executives; Gartner TalentNeuron

New Skills Applied measures the percentage of new skills employees learn and apply on the job.
Pressure on HR to Get Ahead of Skill Needs

Demands From All Directions to Identify the “Skills of the Future”

CEOs and Business Leaders
60% of HR executives report pressure from CEO to ensure employees have the skills needed in the future.

Employees
Compared to three years ago, 69% of HR executives report more pressure from employees to provide development opportunities that will prepare them for future roles.

n = 75 HR executives
Our Strategy: Predicting Skill Shifts

Q: “My Organization Prioritizes Identifying Skills That We Anticipate Needing in the Future.”

*Percentage of HR Executives*

- **48%** Disagree
- **52%** Agree

*n = 75 HR executives*

Source: 2020 Gartner Shifting Skills Survey for HR Executives

Components of a Predictive Approach

- Focus on identifying a fixed set of future skills.
- Target investments at preemptive development programs.
- Inspire employees to adopt a learning mindset.

Source: Gartner
Goal: Preempt Fast Shifts With Predictive

New Skills Applied Over Time, by Skill Approach

Average Percentage of New Skills Applied

Hypothesis: A predictive approach will increase the percentage of skills employees learn and apply on the job.

n = 6,510 employees; 75 HR executives; 35,166,515 job postings for IT, Finance and Sales in U.S.

Source: 2020 Shifting Skills Survey for Employees; 2020 Shifting Skills Survey for HR Executives; Gartner TalentNeuron

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Predictive Approach Is Worse Than Reactive

New Skills Applied Over Time, by Skill Approach
Average Percentage of New Skills Applied

A predictive skills approach results in employees only applying 37% of the new skills they learn.

n = 6,510 employees; 75 HR executives; 35,166,515 job postings for IT, Finance and Sales in U.S.
Source: 2020 Shifting Skills Survey for Employees; 2020 Shifting Skills Survey for HR Executives; Gartner TalentNeuron
# Shortfalls of A Predictive Approach

## Three Reasons A Predictive Approach Decreases Application

<table>
<thead>
<tr>
<th>HR Questions</th>
<th>Faulty Assumptions</th>
<th>Today’s Reality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>How do you create a skill strategy that meets changing needs?</td>
<td>No Crystal Ball</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>How do you develop skills more quickly?</td>
<td>Shortening Half-Life of Skills</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>How do you get employees to rapidly upskill as needs change?</td>
<td>Undirected Learning</td>
</tr>
</tbody>
</table>

- **Faulty Assumptions**
  - "We can identify a set of skills that will prepare our workforce for changes that come."
  - “If we provide robust learning offerings, our employees will get the learning they need.”
  - “If our employees adopt a learning mindset, they will learn the new skills they need for the future.”

- **Today’s Reality**
  - **No Crystal Ball**
    - Predicting and committing to a defined set of future skill needs leads organizations to focus on the wrong skills.
  - **Shortening Half-Life of Skills**
    - The duration for which skills are used in a job is shortening, leaving much learning content outdated.
  - **Undirected Learning**
    - Employees struggle to see how fast-changing skill needs align with their personal development and waste time on irrelevant learning.

Source: Gartner
Is There a Third Way?

Skill Approaches

Reactive
- Fill skill requests as they come in from the business.
- Rely on proven processes that were effective in the past.
- Expect managers to help drive skill development when new needs arise.

Predictive
- Focus on identifying a fixed set of future skills.
- Target investments at preemptive development programs.
- Inspire employees to adopt a learning mindset.

Source: Gartner
Better Approach: A Dynamic Skills Organization

HR Questions

1. How do you create a skill strategy that meets changing needs?
2. How do you develop skills more quickly?
3. How do you get employees to upskill as needed?

A Dynamic Skills Approach

- Facilitate dynamic cross-organizational networks to sense shifting skill needs.
- Identify and implement skill accelerators to develop skills at the time of need.
- Empower employees with relevant information to make timely skill decisions.

Not an “HR Solution”: A dynamic skills approach requires all impacted stakeholders to manage changing skill needs.

Source: Gartner
Dynamic Approach Maximizes Application

New Skills Applied Over Time, by Skill Approach

Average Percentage of New Skills Applied

A dynamic skills approach results in employees applying 75% of the new skills they learn.

n = 6,510 employees; 75 HR executives; 35,166,515 job postings for IT, Finance and Sales in U.S.

Source: 2020 Shifting Skills Survey for Employees; 2020 Shifting Skills Survey for HR Executives; Gartner TalentNeuron
Dynamic Approach Boosts Key Talent Outcomes

Maximum Impact of Skill Approach on Employee Performance

Percentage of Improvement

<table>
<thead>
<tr>
<th></th>
<th>Percentage of Improvement</th>
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<tbody>
<tr>
<td>Reactive</td>
<td>-10.3%</td>
</tr>
<tr>
<td>Predictive</td>
<td>24.4%</td>
</tr>
<tr>
<td>Dynamic</td>
<td>4.5%</td>
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</table>

n = 6,510 employees  
Source: 2020 Gartner Shifting Skills Survey for Employees

Maximum Impact of Skill Approach on Employee Skills Preparedness

Percentage of Improvement

<table>
<thead>
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<th>Percentage of Improvement</th>
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<tbody>
<tr>
<td>Reactive</td>
<td>-13.6%</td>
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<tr>
<td>Predictive</td>
<td>27.2%</td>
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<tr>
<td>Dynamic</td>
<td>5.1%</td>
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n = 6,510 employees  
Source: 2020 Gartner Shifting Skills Survey for Employees

Maximum Impact of Skill Approach on Employee Engagement

Percentage of Improvement

<table>
<thead>
<tr>
<th></th>
<th>Percentage of Improvement</th>
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</thead>
<tbody>
<tr>
<td>Reactive</td>
<td>-10.1%</td>
</tr>
<tr>
<td>Predictive</td>
<td>3.4%</td>
</tr>
<tr>
<td>Dynamic</td>
<td>24.4%</td>
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</table>

n = 6,510 employees  
Source: 2020 Gartner Shifting Skills Survey for Employees

Maximum Impact of Skill Approach on Discretionary Effort

Percentage of Improvement

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<th></th>
<th>Percentage of Improvement</th>
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<tr>
<td>Reactive</td>
<td>7.1%</td>
</tr>
<tr>
<td>Predictive</td>
<td>34%</td>
</tr>
<tr>
<td>Dynamic</td>
<td>-10.1%</td>
</tr>
</tbody>
</table>

n = 6,510 employees  
Source: 2020 Gartner Shifting Skills Survey for Employees

Note: See Appendix for additional methodology details.
### Building a Dynamic Skills Organization

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skills Sensing Network</td>
<td>Targeted Skill Accelerators</td>
<td>Two-Way Skill Transparency</td>
</tr>
<tr>
<td>1</td>
<td>Lloyds’ Skill-Based Action Planning</td>
<td>CVS Health’s Performance-Driving Learning Moments</td>
<td>Schlumberger’s Skill Backpacks</td>
</tr>
<tr>
<td>2</td>
<td>New York Life’s Skills Advisory Board</td>
<td>Eastman’s Internal Data Science Team Development</td>
<td>EY’s Personalized Role Transformation</td>
</tr>
<tr>
<td>3</td>
<td>Gartner’s Skill Disseminators</td>
<td></td>
<td>Unilever’s Open Talent Economy</td>
</tr>
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## Prepare Dynamic Systems, Stop Trying to Predict Skills

### Goals of Predictive and Dynamic Skills Approaches

<table>
<thead>
<tr>
<th></th>
<th>Predictive</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Who</strong></td>
<td>✗ The learning and development function is primarily responsible for addressing organizational skill needs.</td>
<td>✗ HR facilitates a collaborative network of cross-organizational skills stakeholders to sense and monitor shifting skills.</td>
</tr>
<tr>
<td><strong>What</strong></td>
<td>✗ Focused on identifying a fixed set of future skills.</td>
<td>✗ Focused on implementing transparent systems and strategies to nimbly respond to any skill need as it arises.</td>
</tr>
<tr>
<td><strong>Why</strong></td>
<td>✗ Develop future skills before shortages arise.</td>
<td>✗ Prepare employees to pivot skills as needs clarify.</td>
</tr>
<tr>
<td><strong>How</strong></td>
<td>✗ Develop new learning solutions that target future skill needs.</td>
<td>✗ Leverage existing resources to iterate and course correct solutions to fit today’s environment.</td>
</tr>
</tbody>
</table>

**Motto**

- Predictive: “No room for error, we strive to get ahead of the skills we think you’ll need.”
- Dynamic: “Ready to be wrong, we’re optimized toward always-on sense and response.”

*Source: Gartner*
Q & A
Thank You for Joining Us!

Upcoming Webinar: “The Credentialing Economy and What It Means for Cybersecurity Skills”

When: Tuesday, January 19, 2021, 2:00PM-3:00PM EST

Register: https://nist-nice.adobeconnect.com/webinarjan2021/event/registration.html

nist.gov/nice/webinars