THE NEED TO KNOWLEDGE MODEL FOR COMMERCIAL DEVICES AND SERVICES

The Need to Knowledge (NtK) model is a guide to innovation for technology-based commercial devices and services. It connects the academic research process with the industry standards for new product development to improve the quality and relevance of applied research project outputs so that they are more likely to generate socio-economic outcomes and impacts.

The NtK includes three Phases - Discovery, Invention and Innovation - each with Activity Stages and Decision Gates. The NtK also includes opportunities to conduct knowledge translation to improve communication and information sharing between parties in academic, industry and government sectors.

How can the NtK Model help me?

Applied Researchers and Engineers - get a complete vision of the research, development, production continuum; review supporting evidence that shows you how to complete unfamiliar steps; use the toolbox to learn about resources that can help you at any step in the process.

New Product Development Professionals - review supporting evidence and tools to learn about methods, measures, tools and tips.

Grantees/Grant Applicants – use the NtK as a template for project proposals; use the technology transfer plan template to guide your commercialization or licensing efforts.

Project Sponsors - use the NtK as a checklist to ensure proposals include all steps needed to achieve commercial outcomes that generate socio-economic impacts.

The NtK Model can be accessed at http://sphhp.buffalo.edu/cat/kt4tt/best-practices/need-to-knowledge-ntk-model.html

PHASES, STAGES AND DECISION GATES	ACTIVITY STEPS	TIPS
Phase I - Research The Research Phase (Stages and Gates 1 through 3) involves conducting primary and secondary market research to identify end users, unmet needs and assess the feasibility of envisioned solutions to those needs. The scientific research methodology may then be used where necessary to generate new-to-the-world findings that address unmet needs and/or lend themselves to the proposed solutions. The Research Phase output is new knowledge in the state of Conceptual Discoveries, represented as the results from market, business, and technical analyses, scoping reviews of existing scholarly literature or findings from original scientific studies.		

Stage 1: Define Problem and Solution Define the problem from the perspective of the eventual target consumer. Then describe the solution in objective "new to world" terms, not subjective "new to me/us" terms. The problem/solution set may represent an improvement in features/functions of current market offerings, or if may represent an entirely new category of feature/function enabled by some new technological capability.	1.1. Opportunity for importing information via Knowledge Translation: Assess need for device or service with sufficient and detailed input from all relevant information sources and potential user groups (i.e. Manufacturers; Clinicians; Consumers; Policy/Funders; Brokers; Researchers).	Limit disclosure of information regarding solution and document all original thinking related to solution).
	1.2. Identify a problem (need) in terms of functional limitation or environmental barrier, and also identify intended target audience for solution. Identify this project's specific context for both problem and solution.	Opportunity for Universal Design (UD). Be mindful that the problem might be shared by others.
	1.3. Propose plausible solution (goal) to problem in the form of a new/improved device or service. Then ask and answer this key question: *Why does the envisioned solution to the validated problem not yet exist?*	
	1.4. Determine scope of project (role); and expected project results (output) as conceptual discovery from scientific research, prototype invention from engineering development; or commercial device/service innovation from production.	Scope of project determines segments of KT4TT model involved with research generating discovery, development generating invention and production generating innovation level outputs.
	1.5. Consider path from planned project output (Conceptual Discovery; Prototype Invention; or Product /Service Innovation) to target market and beneficiary stakeholders. Ask and answer this key question: How will target users find and access the Product/Service? Profile potential co-development partners or downstream Stages/Gates.	Consider resources, timelines, and partners when defining path to market.

Decision Gate 1: The project leader has three options: 1) Proceed directly to Stage 2; 2) Reiterate Stage 1 if any of the critical elements are not fully validated; or 3) Terminate the project due to inability to clearly articulate critical elements including: Problem, Solution, Target Audience, Project Path, or Intended Output. Key questions include: *Does the proposed problem/solution set appear to be novel in state of practice; generally feasible to implement; will envisioned output be useful to target audience; and is there a clear path from project output to the beneficiary stakeholders?*		
Stage 2: Project Scoping Conduct intensive screen to validate novelty, feasibility and utility to commercial partner and competitive marketplace.	2.1. Define intended outcome as a technology-based innovation: either a new/improved product/service in commercial marketplace, or a new/improved process supporting product/service creation and delivery.	Delineate positioning strategy of future device/service.
	2.2. Gather input from key stakeholders to perform preliminary valuability assessments, and determine business, market and technical feasibility for envisioned product/service. Ensure core idea is protected and avoid co-invention claims through signed non-disclosure agreements.	Preliminary market assessment — Create potential value proposition including target price and performance parameters. Is concept novel and useful? Will prototype have value to intermediary stakeholders? Will device/service have value by the time it reaches the marketplace? Are there others who could also use this solution, thereby broadening the market? Preliminary technical assessment – Is it technically feasible and do capabilities exist internally or externally to develop and/or produce?
	2.3. Identify potential barriers to project progress through a preliminary SWOT analysis (strengths, weaknesses, opportunities, threats) of the envisioned project, again with input from key stakeholders. All monetary aspects – from financing the project to the cost of producing the product, and eventual selling price – are all critical issues.	
Decision Gate 2: The project leader must decide now if envisioned project output and path to eventual product/service outcomes are still considered innovative (i.e. novel, feasible, useful) in light of results from objective valuability assessments and SWOT		

analysis. Once a decision to continue is made, the project leader must then consider if the project can be conducted within the current state of scientific knowledge, or if this specific project requires the generation of new to the world knowledge. If new to the world knowledge is needed, the project leader should pursue funding to design and conduct scientific research to generate this new knowledge. If all the necessary knowledge already exists, it should be acquired, translated and absorbed for project purposes to complete Stage 3. A key question is: Does the proposed solution and path to output/outcome seem feasible to implement and accomplish?		
Stage 3: Research Conduct scientific research to generate required new conceptual discoveries. Or acquire, translate, absorb, and apply existing science-based knowledge from qualified resources.	3.1. Opportunity for KT: Identify fields of expertise - and individual experts – required to fully address scientific knowledge requirements for project. Create plan to acquire, translate, absorb and apply existing science-based knowledge within project. As required, create plan to generate required new to the world knowledge for project.	
	3.2. Project team identifies specific knowledge gaps (purpose of Stage 3) to be addressed through translation of existing knowledge or generation of new knowledge.	Develop research problem/question.
	3.3. Select appropriate research design (i.e. systematic or scoping review, action research, grounded theory, clinical research) for translating and/or generating knowledge as required.	
	3.4. If there is a need to conduct original scientific research in order to generate new knowledge in the form of conceptual discoveries, prepare/submit proposals and secure funding from appropriate sponsor. If not, skip Steps 3.5 – 3.7 and go directly to Step 3.8.	Develop (Phase I) SBIR, RERC, or other grant proposal to fund proposed work.
	3.5. Once funding is obtained, conduct scientific research by implementing the selected methodologies to understand	Organize infrastructure, instruments and subjects/resources. Collect and analyze data.

	the existing state of the science and generate new knowledge.	
	3.6. Monitor and track quality of research process and results.	
	3.7. Refine process and optimize quality of research results.	
	3.8. Compile results from literature reviews/external experts/scientific research activities, perform analyses and integrate findings into project plan.	Tabulate and organize findings from individual studies. Produce new knowledge through conclusion/finding.
	3.9. Conclusions – evaluate discovery, state knowledge in light of proposed solution to problem. Before proceeding to Decision Gate 3, ensure project team has obtained all fundamental science and engineering knowledge required to successfully accomplish the project's goals. Reserve the option to return to Stage 3 if new requirements for Conceptual Discoveries arise during subsequent stages.	Create platforms for discussion, research and dissemination. Disclose non-proprietary new knowledge and/or protect proprietary new knowledge.
Decision Gate 3: The project leader must determine if the Discovery Phase reaffirmed the potential for the envisioned solution to address the validated problem. If so, either continue project into the Invention Phase (Stages 4 - 6), or identify appropriate partner to make those activities. If neither option is viable, either revisit Stage 2 to check for changes in business, market, or technical feasibility and consider reiterating Research Phase; or terminate project and apply knowledge translation principles to effectively communicate Conceptual Discovery to all relevant stakeholders. The key question asks: *Begin Innovation Phase or conclude project with Knowledge to Action process?*		
KTA for projects terminated at completion of Discovery Phase		
Knowledge Translation Opportunity - for Conceptual Discovery Outputs: Whether or not project continues, pursue this opportunity to initiate knowledge translation	KTA 3A. Use initial need assessment, valuability assessments, and value proposition to match the discovery to the knowledge gap.	

activities to endure the knowledge created in the state of a Conceptual Discovery is shared with all potential users, while taking care to protect enabling elements of that knowledge that might constitute Intellectual Property. This ensures that the time, money and effort expended - and project outputs generated at this point - have some chance of being put into practice by other stakeholders. The Knowledge to Action diagram and linked table provide more detail for tailoring and targeting the project outputs to effectively communicate them to external knowledge users.	KTA 3B. Use need and valuability assessments to demonstrate how the discovery will benefit each separate knowledge user (KU) group.	Develop tools to help each KU group apply/use the discovery. Broadly disseminate tool information and provide multiple access points.
	KTA 3C. Assess barriers (B) to use of the discovery for each KU group.	Survey KU to see why they may not apply or use the discovery.
	KTA 3D. Depending on B, select and implement interventions.	
	KTA 3E. Monitor use of the discovery.	Monitor website hits, citations, phone and email inquiries, survey KU groups on their use.
	KTA 3F. Evaluate outcomes – may have to develop new outcome measures.	
	KTA 3G. Sustain use of the discovery.	Use feedback to modify tools and interventions as needed.
Phase II - Development **The Development Phase (Stages and Gates 4 through 6) first involves establishing a business plan based on the new conceptual knowledge generated in Phase I - Research. The engineering development methodology is then applied to reduce the Phase I conceptual knowledge to practical form through design, building and testing procedures. The output of the Development Phase is new knowledge in the state of a Prototype Invention that has been tested by end users and approved by other relevant stakeholders.**		
Stage 4: Begin Development Effort Build business case for commercial product/service & establish engineering development plan.	4.1. Identify and approach key co-development partners, again under signed Non-Disclosure Agreements. Ask them to answer the key question from Step 1.3: *Why does envisioned solution to problem not yet exist?*	
	4.2. Lay out proposed engineering-based solution to problem.	Consider what combination of hardware and software is necessary to create envisioned Product and Service.
	4.3. Outline preliminary business case that is based on path to market outlined in Step 1.5.	Conduct more detailed technical, business and marketing analyses based on the refined idea for the application of the conceptual discovery knowledge in a product/service.

		Identify potential distribution/promotion outlets.
	4.4. Implement Intellectual Property (IP) strategy in collaboration with technology transfer office or relevant agents.	Finalize Intellectual Property (IP) protection options with attorney, technology transfer office or others as appropriate.
	4.5. Assess regulatory, reimbursement and any related requirements for envisioned product/service.	Generate understanding of design, pricing and timing implications from requirements imposed by various regulatory /standards bodies/ and third party payers (i.e., FCC, FDA, HIPPA, CMS).
	4.6. Initiate key co-development practices with partners.	Identify and assess capabilities of potential external partners. Establish formal relationship with external partners. Nurture relationships with partners to increase likelihood of successful collaboration and transfer.
	4.7. Assess project resource requirements and availability.	Review project requirements in detail for staffing, funding, equipment and timeframes.
	4.8. Generate engineering implementation plan.	Review requirements for engineering analysis, design, fabrication and testing.
	4.9. Prepare proposal to secure necessary project resources.	Obtain required funding from extramural source (e.g., SBIR/STTR grant; private investors).
	4.10. Allocate adequate staff, facilities and finances to complete plan formulated in Step 4.8.	Budget adequate time, money and expertise, particularly from key experts and core staff.
	4.11. Gather, analyze and prioritize target customer requirements.	Conduct Alpha focus groups using rigorous "Industry standard" methods.
	4.12. Identify product/service features and specifications in light of production capabilities and component costs.	Project leader and partners consider feasibility of future scale up (mass production/ delivery) of product/service, and estimate costs versus planned financing and target price points.

		Generate preliminary bill of materials and estimate peripheral costs. Assess required lead times for project components. Identify high-risk areas and bottlenecks in design, fabrication and testing, then create alternate paths.
	4.13. Complete business case using data gathered in prior steps and stages.	Reconcile preliminary business case with remainder of development plans.
Decision Gate 4: Project leader and external partners consider if all elements of the business case have been fully vetted and validated. If yes, continue on to Stage 5. If no, either terminate project or reiterate Stage 4. Key question is: *Should the development plan be implemented?*		
Stage 5: Build and Test Prototype Implement engineering development plan.	5.1. Design and build Alpha prototype models of product/service.	Design/specify components, acquire and combine into 'proof of concept' functional prototype.
	5.2. Monitor progress in Step 5.1 according to plan.	Assess barriers to device/service adoption by intermediary stakeholders. Assess barriers to device/service use by target beneficiaries.
	5.3. Test Alpha prototype models under controlled lab conditions	Perform in-house bench and lab testing according to established performance parameters.
	5.4. Make model revisions based on test results to generate Beta prototypes.	Make technical refinements to generate Beta prototype model.
Decision Gate 5: Project leader and external partners determine if the beta prototype will solve the problem and do so in a form that is feasible to deploy in the marketplace. If yes, continue to Stage 6. If no, terminate or reiterate Stage 5. Key question asks: *Should the project continue and go to beta prototype testing?*		
Stage 6: Beta Testing	6.1. Test beta prototype with target users under controlled lab conditions.	Conduct Beta focus groups Assess barriers to product/service use (e.g., cost, user requirements, alternatives).

Generate invention through iterative testing and validation.	6.2. Refine beta prototype based on lab test results.	Make refinements to Beta version.
	6.3. Test refined beta prototype with target users in the field.	Conduct field tests/clinical trials as required Assess barriers to product/ service deployment in market (cost, appearance, operational requirements, alternatives).
	6.4. Refine beta prototype to finalize invention claims.	Make refinements. Finalize specifications for pre-production prototype model.
Decision Gate 6: Project leaders and partners determine if the beta prototype invention demonstrates sufficient value (customer and market value), according to the preliminary assessments, SWOT analysis and business case. If yes, continue to Innovation Phase (Stages 7 - 9). If not, terminate project and apply KT principles to effectively communicate Prototype Invention output to all relevant stakeholders. The key question asks: *Should the project continue and go to Production Planning?*		
KTA for projects terminated at completion of Invention Phase		
Knowledge Translation Opportunity - for Prototype Invention Outputs: Whether or not project continues, pursue this second opportunity to initiate Knowledge Translation activities to ensure the knowledge created in the state of a tangible Prototype Invention is shared with all potential users (i.e. potential product consumers; or intermediary stakeholders such as a Tech Transfer Officer or manufacturer). This assumes that proper safeguards are in place for any proprietary information (Step 4.4). The KT activity ensures that the public funding expended and the project outputs generated have some chance of being put into practice by other stakeholders. The Knowledge to Action diagram and linked table provide more detail reaching external knowledge user groups.	KTA 6A. Revisit the potential value proposition, business case, and focus group/field test data to communicate the value of the invention to knowledge user (KU) groups.	
	KTA 6B. Use information from the business case and consumer research activities to explore ways the invention can be used by each KU group.	Develop tools to demonstrate how the invention will benefit each KU group and to help each KU group apply/use the invention. Broadly disseminate tool info and provide multiple access points.
	KTA 6C. Assess barriers (B) to use of the invention.	Survey KU to see why they may not apply/use the invention.
	KTA 6D. Depending on B, select and implement interventions.	
	KTA 6E. Monitor invention use.	Monitor use by looking at website hits, citations, phone and email inquiries, and survey KU groups.

	KTA 6F. Evaluate outcomes - may have to develop new outcome measures.	
	KTA 6G. Sustain invention use - use feedback to modify tools as needed.	Use feedback to modify tools and interventions as needed.
Phase III - Production The Production Phase (Stages and Gates 7 through 9) calls for the application of business best practices through the industrial production methodology. Activities include planning for all aspects of production - from manufacturing processes through after-sales service - and the execution of activities related to test marketing, launch, and on-going monitoring of the product and market conditions. The Production Phase output is new knowledge in the state of a Commercial Innovation deployed in the marketplace.		
Stage 7: Production Planning and Preparation Determine final manufacturing processes, pricing and marketing strategies, and test launch activities.	7.1.Draft preliminary bill of materials.	Create assembly structure overview.
	7.2.Develop materials plan.	Detail parts; assess and plan for required lead times. Maintain the preliminary bill of materials (BOM).
	7.3.Estimate market needs and costs for production.	
	7.4.Develop production and capacity plan.	Generate detailed list of manufacturing operations (routers) for production process.
	7.5.Plan and schedule engineering.	Utilize material requirements planning system to ensure adequate inventory of raw materials needed for manufacturing will be available. Add engineering design to BOM as lowest level item. Create a router showing where engineering is needed. Review high-risk areas in design and create alternatives if needed.
	7.6.Plan and schedule tool and process design.	Identify need of new tooling (jigs/fixtures) or manufacturing processes. Add tooling and equipment requirements to BOM.

		Create routers for completing tool design and process implementation. Identify critical areas or bottlenecks.
	7.7.Review costs using preliminary BOM.	Determine if changes to BOM are required based on production process requirements.
	7.8.Review IP protection and obtain final approval from regulatory and reimbursement agencies - as needed.	Begin 510(k) premarket approval with FDA or other means of demonstrating safety and effectiveness as required.
	7.9.Finalize distribution logistics.	Deploying physical product requires inventory for point of sales, sales rep demonstration and restocking through distribution network.
	7.10.Finalize marketing and sales plans.	Choose name (trademark) for product/service. Create user manuals and marketing literature. Identify/manage packaging and service requirements. Identify rollout strategy/pricing schedule. Negotiate final terms with distributor network.
	7.11.Generate post-launch evaluation plan.	Determine how best to maintain contact with customers post-sale to obtain feedback.
	7.12.Initiate trial/limited production runs.	Set numbers to provide valid and reliable feedback.
	7.13.Test market and/or trial sell product/service.	Timely opportunity to revisit Stage 2 scoping activities to detect changes in the market conditions (positive or negative), and assess any potentially competing products or disruptive technologies arising in the interim.
Decision Gate 7: Proceed to Commercial Product/Service deployment if the financial projections and logistical plans support continuation, and the Stage 2 Scoping remains valid. The decision to continue involves higher resources and longer time commitments -- and higher risk -- than all prior Stages. The key question is *Go to Product/Service launch?*		
Knowledge Translation Opportunity - for Commercial Innovation Outputs: Whether or not project continues, pursue this final opportunity to initiate Knowledge Translation activities to ensure the knowledge created in the state of a commercial innovation is shared with all potential users. This ensures that the resources expended and outputs generated have some chance of being put into practice by other stakeholders. There are two sets of linked Knowledge to Action diagrams and tables providing more detail about reaching external knowledge user groups.		

Path 1: If the decision is to launch the device/service innovation into the marketplace, the KTA and innovation phase now converge. In fact, Stages 8 and 9 closely mirror the Action Cycle of the KTA process, as shown in KTA for launched innovation output and described in KTA Table for Launched Innovation Outputs. **Path 2**: If the decision is to not launch the device/service innovation into the marketplace, then the innovation phase ends at Stage 7, and the KTA process (KTA 3) diverges, as shown in KTA for an un-launched innovation output.		
KTA for Un-launched Innovations	KTA 7A. Identify lessons learned from innovation development process.	
	KTA 7B. Adapt lessons learned into tools relevant to each knowledge user (KU) group. Consider instrumental, conceptual, and/or strategic uses of the innovation and lessons learned.	Broadly disseminate tool info and provide multiple access points.
	KTA 7C. Assess barriers (B) to use of tools relating lessons learned. Survey KUs to understand why they may be unable/unwilling to use the tools or apply the lessons learned.	Survey KU to see why they may not apply/use the invention.
	KTA 7D. Select and implement interventions to overcome barriers.	
	KTA 7E. Monitor use of tools and provide support as needed.	
	KTA 7F. Evaluate outcomes. May have to develop new outcome measures.	
	KTA 7G. Sustain use of lessons learned via tools.	Monitor use by looking at website hits, citations, phone and email inquiries, and survey KU groups.
Knowledge to Action Process for Innovation Outputs		

Stage 8: Launch Product Innovation: Sell product in the marketplace and respond to consumer inquiries and problems.	8.1. Initiate production and launch product/service.	Implement rollout through structured practices.
	8.2. Provide product/service support in field.	Provide technical/sales/marketing support as needed.
	8.3. Monitor product/service performance in market.	Continue providing technical/sales/marketing support as needed. Monitor, review and correct technical and production design bugs.
	8.4. Troubleshoot and correct problems in product/service.	Sustain engineering including identification of alternative components in case of discontinuance.
Decision Gate 8: Project leader or partners review product/service performance in market to decide whether to sustain resource commitment in context of other business opportunities. If yes, proceed with Stage 9. The key question is: *Should production continue, based on the post-production assessment?*		
Stage 9: Post-Launch Review: Continue to monitor sales and service inquiries to determine if and when modifications or discontinuance are appropriate.	9.1. Continue production, monitoring and support.	Conduct efficacy study in the context of the project's expectations for the product or service.
	9.2. Troubleshoot and correct problems.	Monitor, review and correct technical and production design bugs.
	9.3. Review performance against expectations.	Sustain engineering including identification of alternative components in case of discontinuance. Review reasons why events occurred. Review lessons learned from event and response.
Decision Gate 9: Project leader or partners review performance data and market/competition factors to inform future decisions. If yes, production/delivery continues until a pre-determined milestone to revisit Decision Gate 9. If no, decide if product/service requires revision, replacement or abandonment, which would determine if process should return to the Discovery Phase, Invention Phase or Production Phase. The key question is: *Should production continue?*		

Notes:

- At each gate the Principle Investigator (PI) must check to ensure that the goal is still novel, feasible, and useful, that the PI's role will make a meaningful contribution and that there is a link between the PI's role and the ultimate goal. If not, the PI must terminate or reiterate.
- Throughout every stage the PI or partner will either be allocating existing internal funds, or seeking external financing (grants, venture capital, etc). An inability to obtain financing either by failing to meet internal criteria required for the allocation of funds, or by failing to obtain external financing will terminate the project.
- Although not depicted as such, this is an iterative process. A no-go decision at any gate may result in termination of the process or reiteration of many or all previous steps and tasks.

NtK Models Glossary

The following glossary is composed of definitions that have either been developed by the Center on KT4TT or excerpted from the website businessdictionary.com. The glossary is intended to provide clear explanations of jargon found within the NtK models. If you are seeking the definition of a term not included in this glossary, please contact the Center so that it may be added.

Alpha Prototype - First iteration of a device under development.

Beta Prototype - Second iteration of a device under development. Typically incorporates consumer input into the product's design.

Bill of Materials - List of all raw materials, parts, intermediates, sub-assemblies, etc., (with their quantities and description) required to construct, overhaul, or repair something.

Bottlenecks - Department, facility, machine, or resource already working at its full capacity and which, therefore, cannot handle any additional demand placed on it. Also called a critical resource, a bottleneck limits the throughput of associated resources.

Business Case - A type of decision-making tool used to determine the effects a particular decision will have on profitability. A business case should show how the decision will alter cash flows over a period of time, and how costs and revenue will change. Specific attention is paid to internal rate of return (IRR), cash flow and payback period. Analyzing the financial outcomes stemming from choosing a different vendor to sell of a company's product is an example of a business case.

Disruptive Technologies - New ways of doing things that disrupt or overturn the traditional business methods and practices. For example, steam engine in the age of sail, and internet in the age of post office mail.

Knowledge Gaps - Data or information that is needed and non-existent.

Knowledge User Groups - Six distinct categories of entities who (may) have an interest in the work of NIDRR technology grantees. The six groups are consumers/end users, clinicians, policy makers, brokers, manufacturers, and other researchers.

Lead Time - Number of minutes, hours, or days that must be allowed for the completion of an operation or process, or must elapse before a desired action takes place.

Positioning Strategy - Marketing strategy that aims to make a brand occupy a distinct 'position,' relative to the competing brands, in the mind of the customer. Firms apply this strategy either by emphasizing the distinguishing features of their brand (what it is, what it does and how, etc.) or try to create a suitable image (inexpensive or premium, utilitarian or luxurious, entry-level or high-end, etc.) through advertising. Once a brand is positioned, it is very difficult to reposition it without destroying its credibility.

Product - Good, idea, method, information, object, service, etc., that is the end result of a process and serves as a need or want satisfier. It is usually a bundle of tangible and intangible attributes (benefits, features, functions, uses) that a seller offers to a buyer for purchase.

SWOT Analysis - Situation analysis in which internal strengths and weaknesses of an organization, and external opportunities and threats faced by it are closely examined to chart a strategy.

Stakeholders - Person, group, or organization that has a direct or indirect stake in an organization because it can affect or be affected by the organization's actions, objectives, and policies.

Universal Design (UD) - Universal Design involves planning and constructing all the necessary functions, features, forms or structures of a product, service or environment to meet the needs of as many people as possible.

Value Proposition - Mix of goods and services, and price and payment terms offered by a firm to its customers.

Definitions have been developed by the Center on KT4TT unless otherwise noted.

*BusinessDictionary.com. (2009). Definitions retrieved June 17, 2009, from http://www.businessdictionary.com