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Outline of Mining and Industrial Safety Technology and Training Innovation (MISTTI) Tasks 1-5

Task 1 - Management/Administrative Core (including Project Evaluation)

1.1 –Provide support for project tasks with budgeting and accounting, personnel, progress reports, evaluation, public relations, logistical support, computer/information technology support, and other project management.
1.2 - Ascertain to what degree and with what measurable criterion each MISTTI task is relevant (focused on meaningful topics) and having or showing potential for significant impact to improve health and safety practices in the mining industry.

Task 2 - Worker Safety Training Research Plan Objectives

2.1 – Investigate and analyze mine safety training need
2.2 - Design and develop innovative training modules to address mine safety training needs
2.3 - Design evaluation procedures and begin to evaluate the effectiveness of the mine safety training modules developed

Task 3 Mine of the Future Objectives

3.1 - Explore potential strategies designed to provide safer mining conditions for workers by minimizing exposure to hazardous site conditions while working at mountain top reserves. By utilizing a Mine of the Future model, the project task will focus on recommendations that may be implemented in mountaintop mining to create a safer working environment for miners and aid the coal industry in meeting all regulatory mandates
Work began on the formation of a coal industry contact group to support the project activities of Subtask 3.1.
3.2 - Develop a technology that will provide mine impoundment inspectors and regulatory agencies with improved field inspection methodology, accurate inspection records, verification of documentation methods, and a historical record keeping system that can assist in dam inspection and lead to improved mine impoundment safety.
Equipment for the completion of the project is in the process of being purchased. Two impoundment sites were selected for this subtask.
3.3 – Develop resources to predict potentially flooded mine breakout locations and map such locations on a priority-based scale.
Work on Subtask 3.3, was begun with initial mapping of mine pools and potential breakout points.
3.4 - Demonstrate a mobile mine scout capable performing tasks specific to mine rescue, mine safety, and next-generation training tools.
Within Subtask 3.4, the groundwork for development of the mobile scout concept was laid including activities related to
1) Researching and documenting mine rescue practices for the design and creation of a mine rescue robot interface;

2) Establishing communications with mine rescue experts from the government, mine rescue teams, rescue trainers, and a commercial service company that performs robotic underground inspections;
3) Selecting and collecting data from relevant 3D and image based robot sensors for characterization analysis; and 4) Establishing a methodology and baseline data for characterization of robot sensors.
3.5 - Identify strategies to address issues related to the merger of environmental, planning, and production challenges at multiple-seam, co-located, and proximal mine sites.
Subtask 3.5 involved continued activities by project staff to analyze the conditions related to the Upper Big Branch mine disaster environment and a review of geologic and engineering approaches related to proximal mine safety and health. Discussions and consultations were held with representatives from natural gas and oil mining industries; officials from MSHA, West Virginia Department of Natural Resources, and the West Virginia Office of Miners' Health Safety and Training; staff from CONSOL Energy.

Task 4 International Mining Health and Safety Symposium (IMHSS) Objectives
4.1 - Convene technology developers; equipment manufacturers; federal government officials; state government officials; international representatives; organizations representing the mining industry and community; miners and miners' representatives; and others to explore, discuss, and analyze the development, approval, and adoption of state-of-the-art technologies and mining methods.
4.2 - Provide opportunities for an open exchange of ideas and information among stakeholders with the ultimate goal of improving mine safety and health environments.
4.3 - Update stakeholders on new developments related to mining safety and health laws and legislation.

Task 5: Mine Escape and Rescue Technologies: Evaluating Mining Disaster
Prevention Research and Strategies Related to the Recovery of Trapped Miners
5.1 - Investigate, collect, and disseminate information and research related to mine and escape technology strategies which have been successfully employed in the past or could be utilized in the future to provide a safer working environment for miners. Included in these activities will be an investigation of disaster prevention technologies research related to coal dust, methane gas, and mine ventilation issues.
5.2 - Evaluate currently employed disaster prevention systems in U.S. underground coal mines and current regulations/procedures especially related to mine ventilation, methane gas control, and the removal and/or control of coal mine dust. Of particular interest is the use of atmospheric monitoring systems, rock dusting, ventilation approaches, methane detection and monitoring and methane drainage technologies. Current technologies will be reviewed for their capabilities related to disaster prevention, to identify current equipment manufacturers, and to identify potentially new/alternative equipment.

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5.3 - Review and analyze active and present coal dust controls and will examine new technology capable of monitoring gas and dust levels. Central monitoring systems used both domestically and internationally will also be examined as well as an analysis of regulatory structures pertaining to gas and dust ventilation procedures and requirements.

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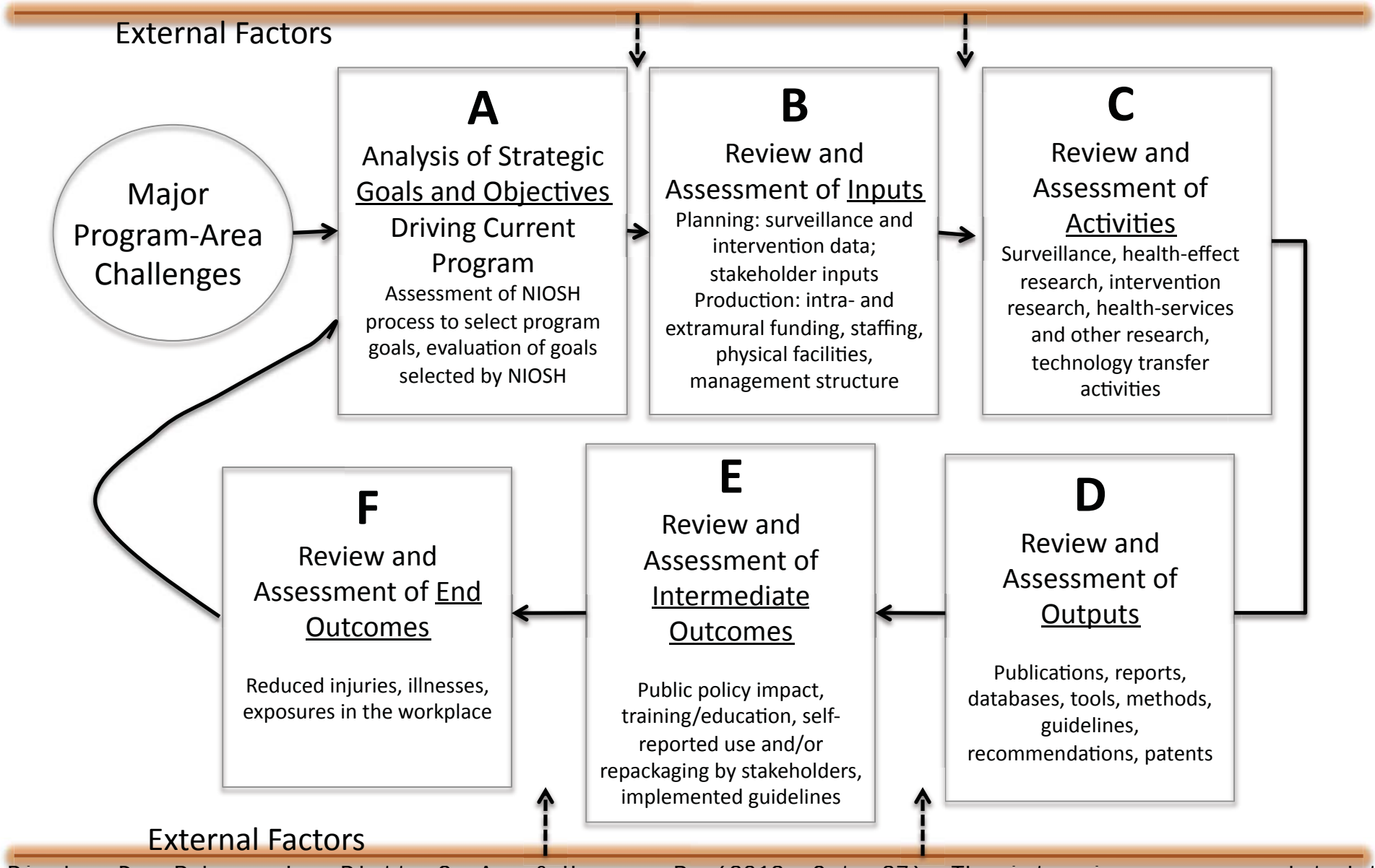
Table 1.1. Comparing Knowledge-for-Action Theories

Theory	*Roots*	*What Moves?*	*How?*	*Key Influences on Process*	*Added Lens*	*Evaluation Implications*
Knowledge utilization	Intersection of science and philosophy	Research knowledge	Instrumentally Conceptually Symbolically As process	Time Resources Support Leadership Politics	Many meanings of use, nonuse, and misuse	Value linked to meaning of use by intent, stakeholder, and context
Diffusion	Rural sociology and communication	Innovation	Innovation is communicated through channels over time among members of a social system	Innovation characteristics Social system Time Communication channels	Spread	Outcomes link to adoption curve Innovation may be adapted
Implementation	Political science and public administration	Policy Program	Top down Bottom up Contingency Democratic Networked	Policy Context Stakeholders Politics, power Values Administration	Sociopolitical factors Feasibility	System influences Value transparancy Contribution Process matters
Transfer	Science and technology	Learning Technology Policy	Mechanisms such as training, implementing, diffusing, or marketing	*What* moves Mechanism Context	Direction of movement Comparability of contexts	Initial and final *what* are comparable
Translation	Linguistics and communication	Research products or syntheses	Communication Ongoing interaction and exchange	Stakeholders Politics, power Commitment Capacity Communication	Language	Sustain stakeholders Informed decisions Outcome link

(Ottoson, 2009, p. 10)

Ottoson, J. M. (2009). Knowledge-for-action theories in evaluation: Knowledge utilization, diffusion, implementation, transfer, and translation. New Directions for Evaluation, 2009(124), 7-20. doi: 10.1002/ev.310

Logic Model



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Mining and Industrial Safety Technology and Training Innovation (MISTTI) Partial List of Interview Codes

StrategicGoals

SG-1 - Reduce respiratory diseases
SG-2 - Reduce noise/hearing loss
SG-3 - Reduce repetitive/cumulative musculoskeletal injuries
SG-4 - Reduce traumatic injuries
SG-5 - Reduce risk of mine disasters/Enhance safety emergency responders
SG-6 - Reduce ground failure fatalities/injuries
SG-7 - Determine impact of changing mining conditions, technologies, patterns of work

Outputs

OT-1 - Patent
OT-2 - Publication (excludes web documents)
OT-3 - Publication (Guidelines) – recommends policy/procedure
OT-4 - Web document
OT-5 - Software – computer program
OT-6 - Standards – approved by organization/agency
OT-7 - Training
OT-8 - Video – includes electronic videos
OT-9 - Workshop/Seminar/OIB (Open Industry Briefing)

StakeHolders

ST-1 - Academia
ST-2 - Community/Civic Organizations
ST-3 - Equipment Manufacturers
ST-4 - Government (Local, State, Federal)
ST-5 - Industry (Excluding Equipment Manufacturers)
ST-6 - International
ST-7 - Journalists and Media Professionals
ST-8 - Labor Organizations
ST-9 - Public Health and Advocacy Organizations