Технологічний розвиток XXI століття ставить перед сучасною школою нові завдання. У статті представлена можливість використання сучасних інформаційних технологій на прикладі інтерактивної дошки, а також впровадження до навчання сучасних методів з використанням інноваційних комп'ютерних ігор. Створена в Польщі, перша соціальна мережа Eduagmes.pl допомагає вчителям, батькамв та дітям поєднувати гру з навчанням за допомогою представлених на порталі розвиваючих ігор, які сприятимуть підвищенню ефективності навчання, поєднуючи з розвагою. Інноваційний метод навчання WebQuest – це метод засобів інформаційних технологій. Його універсальність дозволяє використовувати WebQuest у навчальному процесі кожної дисципліни на будь-якому етапі навчання.

The technological progress of the 21st century poses new challenges for contemporary school. The text presents possible ways of using modern information technologies on the example of an interactive board as well as provides an introduction into the teaching process an innovative teaching method which uses computer games. Edugames.pl- the first social network with educational games in Poland- helps teachers, parents and children to combine education with play through games, which can increase learning efficiency by combining learning with entertainment. WebQuest is an innovative teaching method which exploits resources of information technology. Its universal character allows the method to be used in the educational process of any subject on every stage of education.

Słowa kluczowe: środki dydaktyczne, współczesna szkoła, tablica interaktywna, gry komputerowe, portal społecznościowy Eduagmes.pl., metoda WebQuest.

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RESPONSIVE MUSIC LISTENING AS AN INNOVATIVE METHOD IN PROFESSIONAL TRAINING OF NORWEGIAN STUDENTS AND TEACHERS

In my professional work as a teacher educator for the music teacher profession I have always been interested in the effects of repeated listening to music on young people and how musical exploration influence students' attitudes to music as a part of professional training. In my student days, in the years 1968-1970, I wrote a master thesis as a part of an experiment in psychology that dealt with the influence of repeated listening on students' attitudes to relatively unknown music. Norwegian title: *Bekjenthetsgradens og informasjonsmåtens betydning for endring av holdning over relativt ukjent musikk* (B.Espeland: 1969) (translated: The Significance of Change in Attitudes to Relatively Unknown Music Related to the Degree of Familiarity and Given Ways of Information). This interest has been important in my whole professional life as a teacher educator. It was therefore only natural that I started to use music listening as an innovative method in the professional training of teachers. In the following I will describe and evaluate the listening method «Music in use», developed by Magne Espeland, professor at Stord/Haugesund University College, Norway. My description will contain references to my own thesis, e.g. in page 9, «Repeated listening and musical exploration».

In a two-year project, 'Music in Use', conducted in Norwegian primary schools, Magne Espeland and his colleagues developed new principles and methods for encouraging children to listen to music of many different styles. The experiences of this project, related to current didactic listening theory, were described in the article «Music in Use: Responsive Music Listening in the Primary School» (1987). In 1992 the experiences resulted in the teaching book *Musikk i bruk* (*Music in Use*), revised in 2004 by the name of *Lyttemetodikk* (*Listening Methods*).

In 2006 the method was integrated in the music teaching books *Upbeat* by Regina Murphy and Magne Espeland, as a supportive part of the Irish Primary School Curriculum in Music.

The listening method has also been widely used in the secondary schools and at teaching training colleges in Norway. The concluding part of the article will contain an evaluation based on my own experiences with «Music in Use».

Background

In his article «Music in Use: Responsive Music Listening in the Primary School» (1987), the author describes how teachers of music often express their lack of competence with respect to teaching music, especially when it comes to listening methods. They are much more creative in their educational use of texts and pictures.

Music in use
Magne Espeland

Auditive impression

Expression

Single sounds

Sounds in contrast

Very short pieces of music (20-60 sec.)

Slightly longer pieces of music (up to 2 or 3 min.)

Verbal/vocal expression
such as:
* discussion
* associating words/making up prose and poems
* inventing roles/making up dialogues
* making up stories

Visual/pictorial expression
such as:
* painting/drawing picture(s)
* colour/form on transparencies
* making scores
* music puzzles (graphic notation)

Kinaesthetic expression
such as:
* free movement illustrating/ characterising music
* making up dances
  showing structures in the music (form, etc.)

'New' musical expression

* Related composition inspired by
  – visual and/or verbal stimuli relevant to a piece of music (activity before audition)
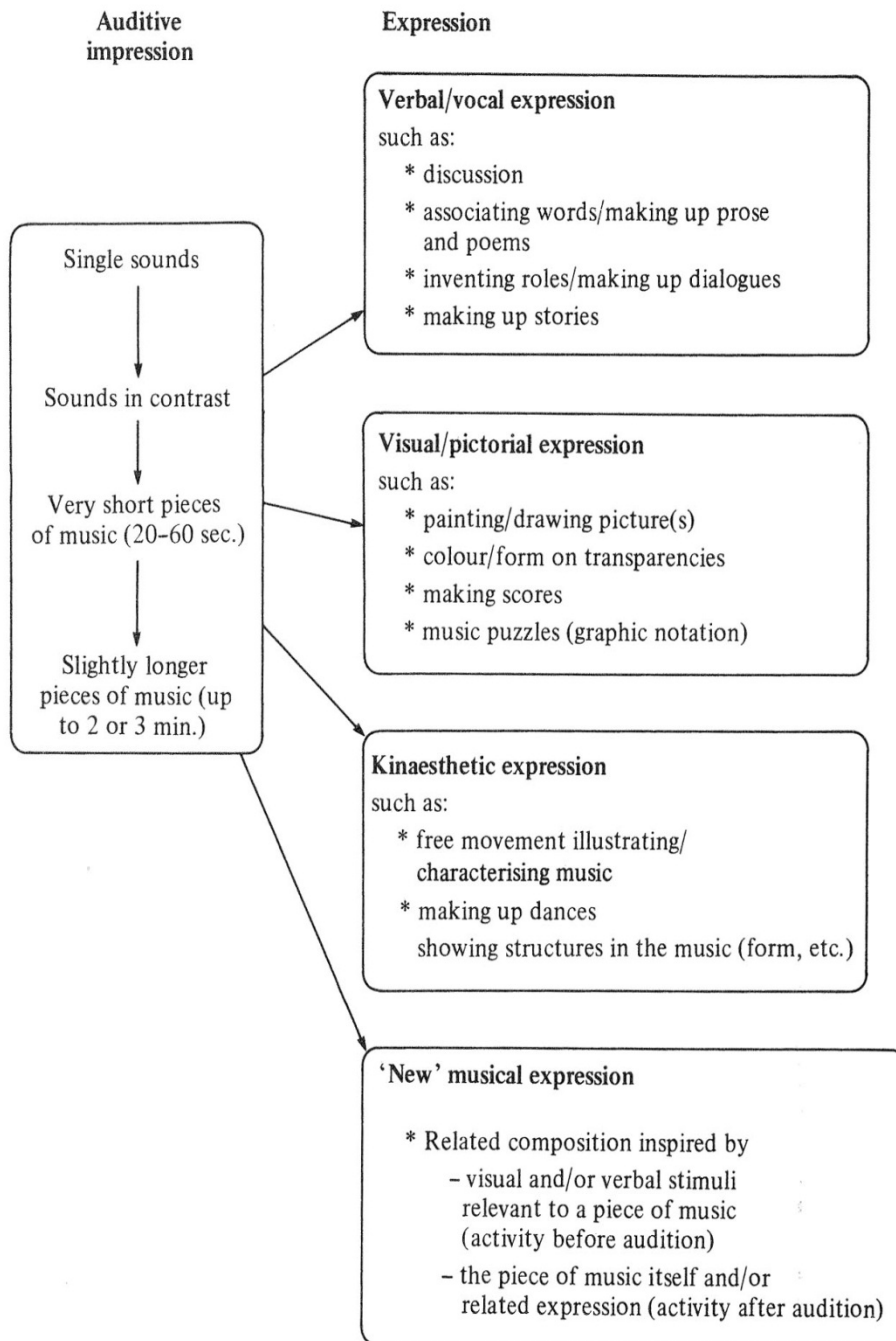 – the piece of music itself and/or related expression (activity after audition)

Fig. 1. **Music in use** – activities

In many music educational settings the given task requires too much of the children, for example when they listen to pieces with a length of more than five minutes. They are supposed to recognize rhythms, motives and forms based on one or two hearings in complicated «sound pictures», at a short notice. When they use graphic or note scores, the majority of these are too difficult to understand.

The author goes on to reflect upon some of the positive influences in music education based on the principle of active learning. This was the case in the nineteen seventies, introduced by music composers and pedagogues like John Paynter and Peter Aston. In their book *Sounds and Silence*

(1970) they emphasize the value of group and classroom compositions as a new way of approaching composed music. It was emphasized by Brian Loane in his article, «Listening in Music Education» where he states: «The best way to place listening at the heart of music education may be to place the activities of composition-listening and performance-listening at the heart of all music lessons» (Loane: 1984).

Composing certainly requires listening and concentration, and as we shall see in the following, it is a basic way of musical expression in the «Music in use» methodology. The concept of *use* is used both as a basis for learning sounds and pieces of music, and is also relevant while learning other expressive subjects. The selection of the music is made for musical and educational reasons, with a focus on music of short duration with clear contrasts.

Basic principles and activities of the «Music in use» method

The design of the activities is based on an impression-expression model, where the pupils' auditory impression of the music is related to different modes of expressions or activities. Activities like language, visual art and movement form basis for a dialogue and discussion between teacher and children and between children within a given group.

A central principle in the method is the emphasis on the relationship between the auditory impression and the resulting corresponding expression, which depends on the listening task and the type of listening.

There are two main types of listening: *Formal listening,* making the children focus on the structural elements of the music, and *associative listening,* utilising the children's associations when listening to the music.

The didactic learning model offers various opportunities as regards type of expression related to the listening task. To illustrate this I will present four learning tasks, one from each category of expressions. The examples are taken from the resource book *Lyttemetodikk* (Espeland: 2004).

1. Verbal/vocal expression

Conversation about a given musical piece can be a rewarding experience in a classroom situation. It serves as a form of conscious element in the learning process, either in the form of a clarifying dialogue between teacher and pupil, or as a basis for preparation and development of other expressions, for instance in storytelling or drama. The music can give associations of various kinds, stimulating the pupils to verbal expressions, texts like prose, poems, dialogues, adventures and fairy tales.

2. Visual/pictorial expressions.

Among these are graphic notation and music puzzles, which in «Music in use» has proved to be very useful materials in music listening.

In order to learn and understand graphic notation, the pupils at first start experimenting with sounds, using contrasting instruments. In the course of their experimentation they learn how basic elements of sounds and music can be produced and varied. The teacher makes them aware of elements like *sonority* (light and dark sound colour), *length* (short, intermediate and long sounds), *directions* (upwards-downwards or horizontal movements) and *volume* (light, intermediate or strong sounds). After this the pupils make their own drawings of a single sound or a succession of sounds. In their experimentation they gradually discover principles of graphic notation, *visual codes*, which correspond with the sound characteristics of the various musical elements. Having obtained some basic knowledge of notation, the pupils can proceed to the next listening task: *«Let us draw the music»:*

Listen to three short music examples and draw the music the way you experience it. Use a sheet of paper for each music example. You will hear the music several times.» (Espeland: 2004: 32, my translation).

The music example consists of three contrasting instrumental excerpts from «*Fantasia sopra Laudi»* by Ingvar Lidholm, «*Peintures»* by Bjørn Fongaard, and «*Divertimento»,* by Jan Carlstedt.

The learning model consists of five basic stages of learning: *Presentation, activation, sharing, processing* and *evaluation.*

Presentation. The children receive the actual task. As an introduction they repeat how they can draw sounds, giving examples at the blackboard..

Activation

This is the most important stage of working. The children are listening to the music while they make drawings of the given sound excerpts, one at a time in a sequence. The excerpts are played at least three times, in accordance with the wishes of the children. The teacher is in dialogue with the pupils, asking about their notations. How can the drawings show if the music goes up or down, is light or strong, or varies in length in the form of short and long tones? If colours are used, what is the argument for using this or that colour?

Sharing

At this stage presentation and sharing of the children's work is of central importance the pupils listen to their music examples while they follow their drawings. The teacher asks questions and gives comments. They then change drawings to see if they can follow their classmates' notation.

Processing

Implies follow-up work, based on the pupils'experiences. The children, in collaboration with the teacher, find common rules for expressing the given music, relating it to musical elements of the composition. For instance, they discuss how a musical element like melody can be drawn as lines of different lengths and directions. The teacher introduces the term *graphic score* or *graphic notation*, (see also next page, «Graphic notation in the form of *music puzzles*»).

Evaluation: In the final stage the children evaluate their own work. They show and explain how they made their final notation and get assessment from the teacher and their fellow class mates. They now learn more about the instruments of the composition, how they look and how they are used. The teacher introduces the composer.

Graphic notation in the form of *music puzzles*:

Another way of working with graphic notation is music puzzles. This is an entertaining and motivating way of listening to music, helping the children to understand the musical structure of given musical pieces.

A good example is '*March*' from the *Comedians* by Dimitri Kabalevsky. (*Lyttemetodikk*, p. 224) The pupils' task is to arrange the given cards in the right position and sequence, following the development of the composition. In this way they gradually learn about the musical form, which is composed of contrasting and repeated motives. For a closer look at this example, see page 11 where I will tell about some of my own experiences with the listening method.

3. Drama and dance expressions.

Creative dance is of central importance in the 'Music in use' methodology. While listening to music it is often useful to make dances based on music examples with clear forms, with repetition and contrast. In addition to formal listening, associative listening is relevant. Children use their imagination to characterize the dance expressions, for example in the form a baroque dance like *Gigue* from '*Water music'* by George Handel, or in a rustic folk dance like the Norwegian *Halling*. In «Music in use» the main drama activities have been miming, shadow play and role play.

Music example: «*A film star with a golden cigarette holder*» by Antonio Bibalo.

Given task: *Listen to the music. Make a mime play with action that fits well with the music. Rehearse this while listening to the music and prepare a presentation for the other pupils.*

This is a modern piece of piano music with clear resemblances of ragtime music. At the presentation stage the teacher talks with the pupils about miming as a form of expression that can be related to the music. They are not given the title, only listen to the music while using their free associations. The teacher suggests that they can use simple costumes in their work.

In the activation stage the music is played several times while the pupils, working in pairs, are asked to take notes or sketches of their associations. They then start their rehearsing, trying to make sequences that correspond with the development and character of the music.

Processing/evaluation: The groups show the mime plays to each other. They compare them and discuss their various solutions.

In my own teaching, using this listening task, I used to ask my student how the musical elements like rhythm and tempo correspond with the movements relating to the miming expressions. This was a way of clarifying the intentions of the groups, by way of formal and associative listening.

4. New musical expressions

The author writes «In this case, music-making will either precede audition, inspired by some kind of stimuli relevant to the music in question, or it will take place after audition and discussion inspired by the music itself.» (Espeland: 1987: 288)

Example of listening task:

Make a composition that is interesting to listen to. Use the following rhythm:

Use xylophones, rhythmical instruments or other sound resources. Rehearse and present your composition for the class.

Music example: *Allegro con Brio*, from Ludwig van Beethoven, Symphony no 5, first movement. The music is not presented before the students have made their own composition.

In the presentation stage the teacher claps the motif in various ways with the class, making it wander from group to group, from pupil to pupil in the form of imitation. By using xylophones the motif gets a melody.

In the activation stage the pupils are divided in groups, trying out various instruments while they work with the composition under guidance by the teacher. They are asked questions about how they use their motives. Do they use much repetition and imitation? What makes the composition interesting to listen to?

If time allows, the pupils take notes of their composition with graphic notations or make recordings on a minidisc or computer.

Sharing/processing/evaluation

The pupil groups show their different compositions, and explain how they are built on the given rhythmical motive. After this they listen to 'Allegro con Brio' by Beethoven, and in dialogue with the teacher discuss how Beethoven has built up his composition, after listening several times. How does Beethoven use the main motive?

The pupils compare their compositions with the music of Beethoven. What are the likenesses and differences? They are then shown a graphic score from the Norwegian listening book 'Lytteboka' by B.J. Ottem (1971). After listening to the music and following the score, they again discuss the music and its development with an emphasis on formal listening.

In my own teaching practice I have used this example from «Music in use» several times. What strikes me in this case is the great interest the pupils show for Beethoven after having been introduced to his music by way of their own compositions and supplying graphic scores , based on the 'fatal motive'.

Some comments on important aspects of the «Music in use» methodology

Active listening and creativity

The term *active listening* has been of central importance in Norwegian listening methods as far back as the 1960ies and 1970ies. The connotation *active* was first and foremost an *inner* activity based on limited tasks by the teacher or author of the teaching book. In the «Music in use» methodology the *outward* activity is of far more importance. They listen and work while the music is being played, comparing and giving reasons for their expressions.

Repeated listening and musical exploration

These are very typical aspects of learning in the «Music in use» methodology. To make adequate expressions, exploring and solving the problems of their listening task, the pupils often ask the following question*: Teacher, may I hear the music once more, please?* For the pedagogue this is a question of vital importance, which he gladly answers positively. It is an ideal situation to experience his pupils working concentrated on their work, exploring the music and asking for

repeated hearings. This is possible because the musical pieces often are relatively short with clear contrasts

L. Meyer is a well-known music pedagogue who writes about the importance of repeated listening. In his book *Music, the Arts and Ideas*, he states that

«Because listening is a complex art involving sensitivity of apprehension, intellect and memory, many of the implications of an event are missed on first hearing. For, to comprehend the implications of a musical event fully, it is necessary to understand the event itself clearly and to remember it accurately « (Meyer: 1967).

The American music philosopher Bennet Reimer describes musical exploration as 'a process of analysing'. He writes: «When analysis is conceived as an active, involved exploration of the living qualities of music, and when analysis is in constant and immediate touch with the musical experience itself, it is the essential means for making musical enjoyment more obtainable» (Reimer: 1989).

Repeated listening and musical exploration influence persons' attitudes to music. In my research project (B. Espeland:1969) the students consisted of three listening groups, one that only listened to the music, a second group who also received an analysis of the structure of the music, and a third group getting an expressive analysis of the music, using emotionally coloured words and expressions.

The given listening music consisted of two works: *Symphony opus 21* by Anton Webern (1928), and *Aventures* by Gyørgi Ligeti (1962), music that proved to be unknown, unconventional and quite unfamiliar to the students.

The results after several listening periods showed that the group who only listened to the music did not change their attitudes after the first listening, while the groups receiving information slightly changed their attitudes in a positive direction, and especially the one receiving expressive information.

We see here a clear resemblance with the «Music in use» method both with respect to the *formal and associative listening*, and to the principle of *repeated hearings*, both aiming at increasing the students' knowledge and understanding.

Experience and understand

This is a very central learning objective in the Norwegian curriculum of music for the primary and secondary school. In an extensive classroom oriented research work related to the 'Music in use' project Helga Marie Lund concludes: «The pupils developed their musical understanding through interaction with the music as learning material, by interaction between pupils and teacher in a context of designed listening practice. The development of understanding took place in an active process of problem solving, exploration and creativity». (Lund: 1996: 170, my translation).

In my opinion the «Music in use» method clearly emphasises the importance of developing authentic knowledge and understanding by way of active listening and creative expressions related to the music. In my research with university students (B.Espeland:1969) the supplied information was confined to conventional analysis and verbal descriptions of the music, and consequently being of a more superficial character. In his book of listening methods, the author discusses central learning concepts related to musical understanding: *knowledge, competence and attitudes*. (Espeland 2001, p. 110-122)

Experiences with the «Music in use» methodology

As an introduction I give one experience dating back to the spring of 1993 when Magne Espeland introduced «Music in use» for my class of music students at our university. The working seminar inspired one of the music students, Oyvind Nyboe, to write an assignment called «Listening and Creativity» (Nyboe: 1993).
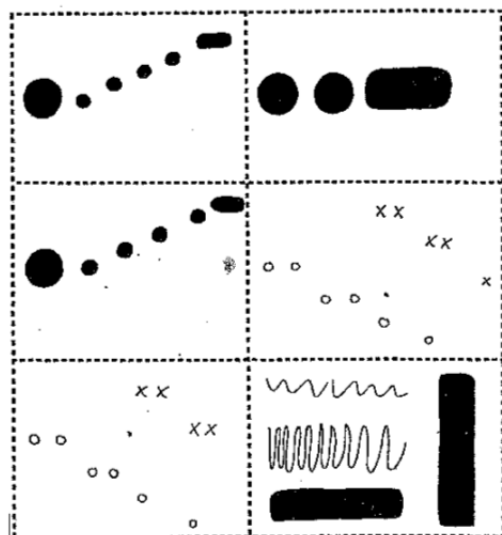
After introducing the objectives of listening in the music curriculum, the student gave an outline of the main principles of the «Music in use» method, followed by a teaching plan for two music lessons.

The first one was based on a self-made composition, performed and recorded on synthesizer, written in eight short parts in varying musical styles: *March, jazz rock, folk tune, classical, Arabic*

folk tune, *heavy rock and disco*. The listening task was to make spontaneous dance movements while listening to the music.

The next two learning tasks consisted of music puzzles with self-made graphic notation, used in different ways. The first one was called *«Contrasts»*, based on a piece of self-composed popular music with clear motives, lasting 30 seconds. The second one, without a title, was used to make a composition. See below

Example 1: «Contrasts»   Example 2
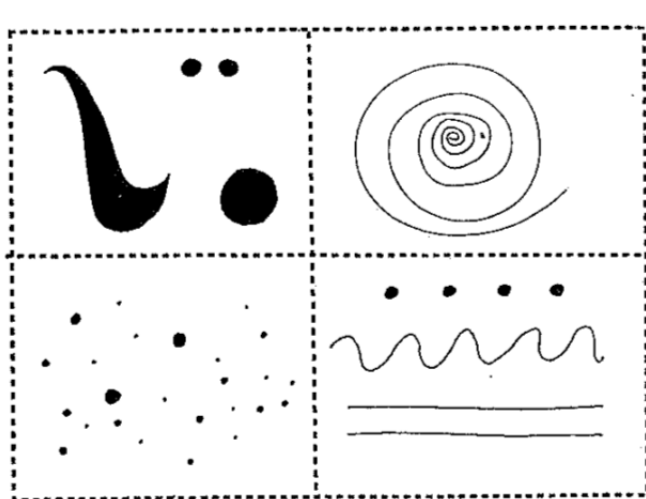
Learning task 1, «Contrasts»
  – Listen to the music and notice the rhythm, pitch, length and dynamics
  – Arrange the puzzle bits in the envelope to fit with the music
  Learning task 2
  – Make a composition based on the given graphic notation in your own choice of order. Don't use more than 15 minutes!
  – Give the piece a title and perform it for the class. Explain why you composed it the way you did.

The teaching plan was implemented in the student's practice period in a secondary school, and gave the student relevant and positive educational feedback. In my opinion the students' assignment clearly shows that he has understood the basic principles of the Music in use methodology. In his graphic notation it is interesting to notice how he is influenced by the author's own version of March by Kabalevsky, especially with regard to details like the falling glissando in example 2, page 11.

Personally I have been using the listening method regularly in the course of the last two decades up to the present time, mostly in my teaching of college students at Stavanger University, but also in Spain on some occasions, in university colleges and primary schools. For me it has been a pleasure to see how well the method has functioned in various educational settings.

I have a vivid experience in mind, also regarding Kabalevsky's music, when I recently was teaching a group of music students at our university. After working with the graphic notation, and finding the AABA form, the students were asked to make their own dances to the same music. This proved to be very successful, resulting in creative group solutions, based on formal and associative listening.

Using the method flexibly and inventively is a basic principle in the author's own approach to «Music in use», something he has told me on several occasions.

In my opinion the listening methodology is holistic in its character, and convincingly integrates the main musical activities of the Norwegian music curriculum: listening, performing, movement and

composition. It is actual, comprehensive and versatile and has proved to have a solid fundament in the field of music didactics and methodology.

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APPLICATION NEURAL NETWORK IN HUMAN INTERACTION SYSTEM

Introduction. The 21st century has been regarded by many as the information era and the penetration Internet connection into home appliances is a new dimension along which technologies continue to grow. We are surrounded by technologies and there are computer technologies in our cars, phones, entertainment systems, and home appliances. The idea is to make use of existing electronics in the devices and, in conjunction with some specialized software, create an intelligent network with access to the Internet.

Definition of network intelligence. Intelligent security and communication networks must at least be able to understand the security and communication environment, to make decisions, and to use and manage network resources efficiently. More sophisticated levels of security network intelligence include the ability to recognize user, application, service provider, and infrastructure needs, as well as expected and unexpected events, the ability to present knowledge in a world model, and the ability to reason about and plan for the future.

For the purposes on this paper, CSNI is defined as the ability of a network system to act appropriately in a changing environment. An appropriate action is one that increases the optimal and efficient use of network resources in delivering high-quality services, success is the achievement of behavioral sub-goals that support the service provider's overall goals. Both the criteria for success and the service provider's overall goals are defined external to the intelligent security network system. Typically, they are defined by the service provider's business objectives and are implemented by network designers, programmers, and operators. CSNI is the integration of