= Sesame Street research =

In 1969 , the children 's television show Sesame Street premiered on the Public Broadcasting Service (PBS) in the United States . Unlike earlier children 's programming , the show 's producers used research and over 1 @,@ 000 studies and experiments to create the show and test its impact on its young viewers ' learning . By the end of the program 's first season , the organization founded to oversee Sesame Street production , Children 's Television Workshop (CTW) , had developed what came to be called " the CTW model " : a system of planning , production , and evaluation that combined the expertise of researchers and early childhood educators with that of the program 's writers , producers , and directors .

CTW conducted research in two ways : in @-@ house formative research that informed and improved production , and independent summative evaluations conducted by the Educational Testing Service (ETS) during the show 's first two seasons to measure the program 's educational effectiveness . CTW researchers invented tools to measure young viewers ' attention to the program . Based on these findings , the researchers compiled a body of data and the producers changed the show accordingly . The formative research on Sesame Street was the first time children 's television viewing was studied scientifically .

Summative research conducted over the years , including two landmark evaluations in 1970 and 1971 , demonstrated that viewing the program had positive effects on young viewers ' learning , school readiness , and social skills . Subsequent studies have replicated these findings , such as the effect of the show in countries outside of the US , several longitudinal studies , the effects of war and natural disasters on young children , and studies about how the show affected viewers ' cognition . As CTW researcher Gerald S. Lesser stated in 1974 , early tests conducted on the show (both formative and summative) " suggested that Sesame Street was making strides towards teaching what it had set out to teach " .

= = Background and development = =

According to author Louise A. Gikow , Sesame Street 's use of research to create individual episodes and to test its effect on its young viewers set it apart from other children 's programming . Co @-@ creator Joan Ganz Cooney called the idea of combining research with television production " positively heretical " because it had never been done before . Before Sesame Street , most children 's television shows were locally produced , with hosts who , according to researchers Edward L. Palmer and Shalom M. Fisch , " represented the scope and vision of a single individual " and were often condescending to their audience . Scriptwriters of these shows had no training in education or child development .

The Carnegie Corporation , one of Sesame Street 's first financial backers , hired Cooney , a producer of educational talk shows and documentaries with little experience in education , during the summer of 1967 to visit experts in childhood development , education , and media across the US and Canada . She researched their ideas about the viewing habits of young children , and wrote a report on her findings entitled " Television for Preschool Education " , which described out how television could be used as an aid in the education of preschoolers , especially those living in inner cities . Cooney 's study became the basis for Sesame Street ; full funding was procured for its development and production and the creation of the Children 's Television Workshop (CTW) , the organization responsible for producing the new show . According to Gikow , the show 's financial backers , which consisted of the US federal government , the Corporation for Public Broadcasting and the Ford Foundation , insisted on " testing at critical stages to evaluate its ultimate success " .

During the summer of 1968 , Gerald S. Lesser , CTW 's first advisory @-@ board chairman , conducted five three @-@ day curriculum @-@ planning seminars in Boston and New York City to select a curriculum for the new program . Seminar participants were television producers and child development experts . It was the first time a children 's television show used a curriculum , which Palmer , who was responsible for conducting the show 's formative research , and Fisch described as " detailed or stated in terms of measurable outcomes " . The program 's creative staff was

concerned that this goal would limit creativity , but one of the seminar results was to encourage the show 's producers to use child @-@ development concepts in the creative process . Some Muppet characters were created during the seminars to fill specific curriculum needs . For example , Oscar the Grouch was designed to teach children about their positive and negative emotions , and Big Bird was created to provide children with opportunities to correct his " bumbling " mistakes . Lesser reported that Jim Henson had a " particular gift for creating scenes that might teach " .

The show 's research staff and producers conducted regularly @-@ scheduled internal reviews and seminars to ensure that their curriculum goals were being met and to guide future production . As of 2001 , ten seminars had been conducted specifically to address the literacy needs of preschool children . Curriculum seminars prior to Sesame Street 's 33rd season in 2002 resulted in a change from the show 's magazine @-@ like format to a more narrative format . There have been over 1 @,@ 000 studies as of 2001 which examine the show 's impact on children 's learning and attention . Most of these studies were conducted by the CTW and remain unpublished . The most important studies that found negative effects of Sesame Street were conducted by educator Herbert A. Sprigle and psychologist Thomas D. Cook during its first two seasons . Both studies found that the show increased the educational gap between poor and middle @-@ class children . Morrow reported that these studies had little impact on the public discussion about Sesame Street . Another criticism was made by journalist Kay Hymowitz in 1995 , who reported that most of the positive research conducted on the show has been done by the CTW , and then sent to a sympathetic press . She charged that the studies conducted by the CTW " hint at advocacy masquerading as social science " .

= = The " CTW model " = =

Shortly after beginning Sesame Street , its creators developed the " CTW model " : a system of planning , production , and evaluation which only emerged after the show 's first season . The CTW model involved the interaction between television producers and educators , the development of a curriculum for three- to five @-@ year @-@ old children , formative research to shape the program , and independent summative research into what viewers learned . According to Cooney , " Without research , there would be no Sesame Street . "

Cooney credited Palmer and his colleague at Harvard , Gerald S. Lesser , whom CTW hired to write the program 's educational objectives , for bridging the gap between producers and researchers . Cooney observed of the CTW model : " From the beginning , we ? the planners of the project ? designed the show as an experimental research project with educational advisers , researchers , and television producers collaborating as equal partners " . She described the collaboration as an " arranged marriage " .

The show 's staff worked to create a non @-@ adversarial relationship between producers and researchers ; each side contributed , as Fisch stated , " its own unique perspective and expertise " . Early in the planning process , production staff recognized that it was valuable to have access to researchers who could analyze children 's reactions and help them improve production , and the show 's writers and producers brought their instincts for and experience in children 's television . Though initially skeptical about both the collaboration and the curriculum , the writers eventually came to see both as integral parts of the creative process .

When educational experts and producers in other countries approached CTW for assistance in producing their own versions of Sesame Street , which became known as " co @-@ productions " , a variant of the CTW model was used . The need for preschool education in each country was assessed through research and interviews with television producers , researchers , and educational experts , similar to the process followed in the US . The producers then convened a series of meetings with the experts , held in the individual countries , to create and develop a curriculum , the program 's educational goals , its set , and its characters . They held meetings , at the CTW offices in New York City and in the respective country , to train the co @-@ production team in the CTW model . Each co @-@ production conducted formative studies before production and if possible , summative studies to test the efficacy of its curriculum .

= = Formative research = =

= = = Methods = = =

Palmer and his team used concepts from the field of formative research , which consisted of in @-@ house , laboratory @-@ oriented research , to guide production and to determine whether the show held children 's attention . Palmer , described by Cooney as " a founder of CTW and founder of its research function " , was one of the few late @-@ 1960s academics studying children 's television and its effects on learning . He was responsible for designing and executing CTW 's formative research , and for working with ETS , which handled the Workshop 's summative research . Palmer 's work was so crucial to Sesame Street that author Malcolm Gladwell asserted , " Without Ed Palmer , the show would have never lasted through the first season " .

CTW 's researchers were strongly influenced by behaviorism , a popular movement in psychology during the late 1960s ; therefore , many methods and tools used were primarily behavioral . Palmer developed " the distractor " , which he used to test if the material shown on Sesame Street captured young viewers ' attention . Two children at a time were brought into the laboratory and shown an episode on a television monitor and a slide show next to it . The slides would change every seven seconds ; researchers recorded when the children 's attention was diverted from the episode . They were able to assess almost every second of Sesame Street this way ; if an episode captured children 's interest 80 ? 90 percent of the time , producers would air it . However , if it only worked 50 percent of the time they would change (or remove) content .

In research during later seasons of Sesame Street , verbal measurements , in the form of letter @-@ recognition tests , were introduced . These reinforced earlier results , providing more insight into children 's knowledge , reactions , and responses than behavioral measures alone . The distractor method was modified by Workshop researchers Lewis Bernstein and Valeria Lovelace into an " eyes @-@ on @-@ screen " method , which collected simultaneous data from larger groups of children . Their method also tested for more " natural " distractions , such as those provided by other children in group @-@ viewing situations ; up to 15 children were tested at a time . Lovelace developed additional testing methods , described by Fisch as " state @-@ of @-@ the @-@ art research design " . One innovation included the " engagement measure " , which recorded children 's active responses to an episode , such as laughing or dancing to music .

= = = Results = = =

Palmer reported that by the fourth season of the show , the episodes rarely tested below 85 percent . At least one segment , " The Man from Alphabet " , despite its expense , was eliminated because it tested poorly with children . The distractor provided new insight into the way children watch television , and was part of CTW 's research on its programs ' effectiveness for decades . It created a body of objective data , and marked the first time that children 's television viewing was studied scientifically .

CTW 's early studies with the distractor found that children learned more when they watched the program carefully , or when they participated by singing or talking along . In re @-@ tests four weeks later , it found that children retained most of what they learned . After the first three weeks , or 15 episodes , viewers and non @-@ viewers were compared ; few differences in learning were found . When both groups were tested after six weeks more differences began to appear , with viewers scoring higher than non @-@ viewers . A two @-@ season CTW study published in 1995 found a " significant increase " in difficulty in remembering the letter and number of the day . Based on the multiple @-@ intelligence theory , producers began to cluster Sesame Street 's short films , animations , and inserts around a single topic rather than sprinkling several topics throughout a single episode .

= = Summative research = =

= = = ETS studies = = =

CTW solicited the Educational Testing Service (ETS) to conduct its summative research . CTW and ETS hired and trained coordinators , testers , and observers from local communities to conduct these studies . The most relevant tests of the show 's effectiveness were comparisons between children who watched it regularly and those who did not . After the first season , however , Sesame Street was so widely watched that it was difficult to make this distinction ; ETS began to have problems finding subjects for their non @-@ viewing groups , which weakened the experimental design . It solved this problem by selecting control @-@ group households from areas that did not broadcast the show . Instead of using groups of viewers and non @-@ viewers , later large @-@ scale studies used statistical designs and methods for estimating cause @-@ effect relationships .

ETS , whose prestige enhanced the credibility of its findings , conducted two landmark summative evaluations in 1970 and 1971 , demonstrating that Sesame Street had a significant educational impact on its viewers . These studies illustrated the early educational effects of Sesame Street , and have been cited in other studies of the effects of television on young children . ETS reported that the children who watched the show most learned the most , and achieved better results in letter @-@ recognition skills . Three @-@ year @-@ olds who watched regularly scored higher than five @-@ year @-@ olds who did not ; children from low @-@ income households who were regular viewers scored higher than children from higher @-@ income households who watched the show less frequently . Similar results occurred in children from non @-@ English @-@ speaking homes . Although adult supervision was not required for children to learn using the material presented , children who watched and discussed the program with their parents gained more skills than those who did not . Children viewing the show in an informal home setting learned as much as children who watched it at school under a teacher 's supervision . Regular viewers adjusted better to the school environment than non @-@ viewers . They also had a more positive attitude toward school and better peer relations than non @-@ viewers .

Despite CTW 's concern that the show would widen the gap between well @-@ to @-@ do children and their less wealthy peers , there was no evidence that this occurred ; gains made by disadvantaged children were as great as those by advantaged children . The show 's positive general effects , as cited by ETS , occurred across all childhood demographics (gender , age , geographic location and socioeconomic status) . Studies conducted by ETS seemed to suggest that the program had " a significant impact on children 's social behavior " , although the evidence was not as strong as it was for cognitive effects ; fewer studies exist of social behavior .

= = = Later studies = = =

CTW enlisted Palmer , in conjunction with Harvard University , in 1979 to conduct a study in Jamaica regarding the effects of Sesame Street on children with no exposure to other children 's television programs , in order to correct for the effects of multimedia exposure on children in the US . Palmer discovered that Jamaican children 's interest dropped during segments with the Muppets , possibly due to language and cultural differences ; musical segments were the most effective . The children 's learning increased after exposure to the show , especially letter and number recognition .

In 1995 a longitudinal study was conducted at the University of Kansas , the first large @-@ scale evaluation of Sesame Street 's cognitive effects in over twenty years . Its findings supported those of previous studies : early viewing of educational children 's television appeared to contribute to children 's school readiness . Children from disadvantaged backgrounds learned as much as advantaged children per hour of viewing , but they did not watch enough to gain the program 's maximum benefit . In comparing the effects of watching Sesame Street with other programs , commercial entertainment and cartoons had a negative effect ; watching Sesame Street daily did not increase children 's viewing of other categories of television , nor make them less likely to

participate in other educational activities .

Other studies have been conducted about the cognitive effects of Sesame Street . In 1990 , a two @-@ year longitudinal study found that viewing the show was a " significant predictor " of improved vocabulary regardless of family size , parent education , child gender or parental attitudes towards television . Another study conducted in 1990 looked at the effect of Sesame Street home videos and discovered gains in vocabulary , letter , and printed- and spoken @-@ word identification . The videos encouraged discussion with adults , which may have helped reinforce educational messages and content .

In 1994 , research was conducted for " The Recontact Study " , funded by the Markle Foundation , which examined the effects of Sesame Street on adolescents who had watched the show as young children . The subjects had participated in previous studies as preschoolers . When the study 's research subjects were statistically equated for parents ' level of education , birth order , residence and gender , it found that adolescents who had watched Sesame Street as preschoolers were positively influenced by it . Compared with children who had not watched it regularly , they had higher grades in English , math , and science ; read for pleasure more often ; perceived themselves as more competent , and expressed lower levels of aggression . The effects were stronger in adolescent boys than in adolescent girls .

In early 2001 , the Workshop conducted a summative study about the effects of war , natural disasters , and other events on young children . It demonstrated that little was being done to address the fears and concerns of victims of traumatic events . As a result , the Workshop developed a series of materials it believed would help children (and their families) cope with events such as the September 11 terrorist attacks and Hurricane Katrina .

Sesame Street has been used to test the attention span of infants and toddlers . In 2004 , children from three months to two years were shown Sesame Street clips and a group of computer @-@ generated black and white patterns . Their attention spans , as determined by the duration of time they looked at the stimuli , significantly increased at six to twenty @-@ four months , but only for the Sesame Street material . A study conducted in 2006 found that infants ' attention span increased more when they were presented with video clips than with still images of the same stimuli , supporting the idea that movement helps young infants gain more information from the world around them . The evidence showed that attention span depended both on age and the on the type of stimuli children viewed . The time they looked at stimuli decreased for all types of stimuli from fourteen to twenty @-@ six weeks , but the time they looked at it increased depending on the stimuli . When older infants (age fourteen weeks to twelve months) looked at Sesame Street materials and human faces , their attention increased compared to other types of stimuli .

In 2010 , researchers at the University of Michigan studied the effect of combining video clips of Sesame Street and related print materials , online activities , and teacher training and mentoring on learning . They demonstrated that all the subjects they tested at Head Start programs in Detroit scored the same as a middle @-@ class control group in tests later given to both groups .